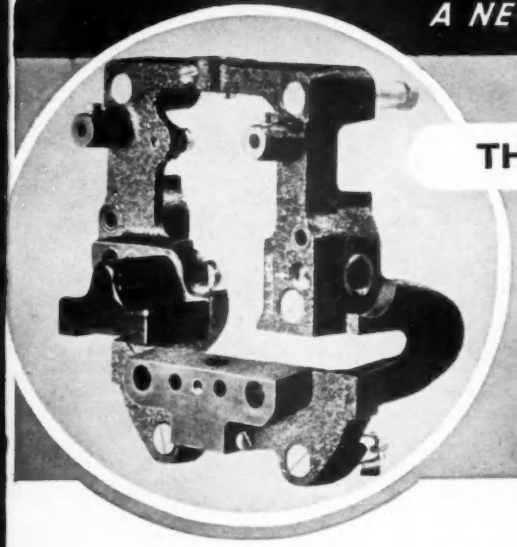
ELECTRICAL TIMES

THURSDAY
13 AUG. 1953
NINEPENCE

A NEW STANDARD IN METERS



THE MAIN FRAME

The main frame is a robust casting made in the Ferranti foundry. The driving and braking systems are attached to it by dowels giving great stability to the meter's performance and ensuring similarity of performance in individual meters. It provides an excellent magnetic screen between the driving and braking system.

FERRANTI LTD., HOLLINWOOD, LANCS.
London Office: KERN HOUSE, KINGSWAY, W.C.2.

FM97c

FERRANTI

FERRANTI F M Meter

In six grades from soft to rock hard, and four qualities from medium grey to superfine, high-quality white, our range of polishing bobs includes the ideal wheel for every class of work. Send today for our free, illustrated brochure.

With greatly increased factory capacity we are now able to offer quick delivery.

COOPERS FELT

Please send inquiries to Head Office and Works

COOPER & CO. (B'HAM), LTD., BRYNMAWR, BRECONSHIRE

Telephone: Brynmawr 312. Telegrams: Felting, Brynmawr.

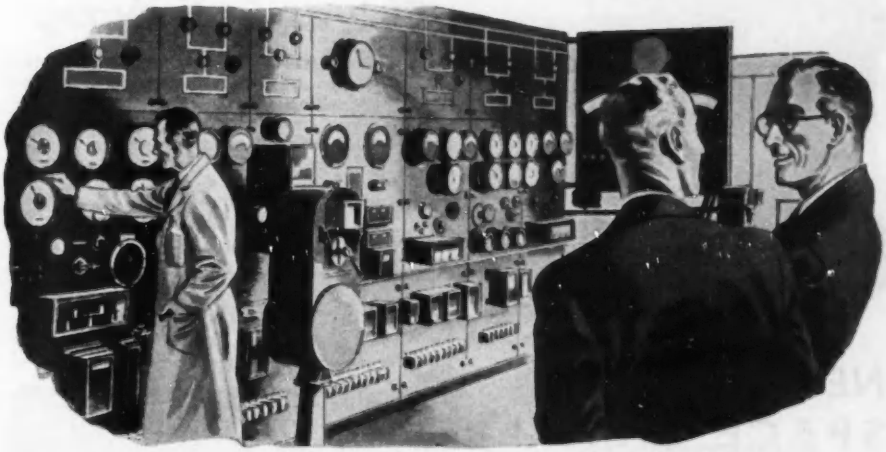
Registered Office and Works: Little King St., B'ham, 19

...and not a penny on battery repairs in 12 years*?

Yes—AND 740 cells in use

What's so special about Nife?

They're made of STEEL—an engineering job



* *These are the actual details of the performance of Nife batteries operated by a Municipal Authority.*

Every Nife battery is a superb example of precision engineering in steel. This technical perfection is the reason why there is 'longer life in a Nife'—and almost complete freedom from replacement costs.

ROBUST CONSTRUCTION Made of steel — case and plates — a Nife battery has enormous mechanical strength.

COMPLETE RELIABILITY The almost inert electrolyte is actually a steel preservative—so that the battery does not deteriorate even during long periods of inactivity. It will withstand the heaviest rates of charge or discharge — and recover its voltage almost immediately.

SIMPLE MAINTENANCE A Nife is, for all practical purposes, free from self-discharge — the steel plates cannot buckle or shed active material and there is no corrosion of terminals.

(*N.B. Nife Batteries are not yet available for private cars or domestic radio.*)

N25

NIFE STEEL BATTERIES

REPAY THEIR ORIGINAL COST MANY TIMES OVER

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

A

THE FAMOUS Television

MULTI REFLECTOR

FIRE..

8

FIRES IN ONE!

•

WORLD'S BEST SAFEST AND MOST ECONOMIC

NEW TYPE SPACE HEATER

. . . for the middle of a room

Uses only 1 or 2 kilowatts as required

GIVES A WONDERFUL HEAT ALL ROUND!

Stands 17½ inches high on casters

CAN ALSO BE USED AS A COFFEE TABLE OR WARM PLATE

Voltages: 200 to 250 a/c or d/c. 3-core flex 9 ft. long thus making it suitable for use in large or small drawing and other rooms (or hotel lounges, shops, waiting rooms, garages, hospital wards, etc.). Colours: Cream, Ivory, Fawn, etc. As shown on the Television Screen and at the B.I.F., Olympia.

Retails at £8 . 8 . 0 Plus £4 . 12 . 7 Purchase Tax

Trade enquiries to the Manufacturers:

MULTI REFLECTOR FIRES

95 Esmond Road, Crumpsall, Manchester 8

Telephone: Cheetham Hill 1957

EVEREST CONQUEST

Harcourt Oxygen Pressure Gauge assisted in the Great Achievement

Figures in Industry

SMITHS HAND TACHOMETERS show rotational, surface or cutting speeds. Fluctuations of speed are detected and indicated. The pointer may be held by depressing a button. Accuracy is to a tolerance of ± 0.5% at any speed, irrespective of direction of rotation. Supplied complete with accessories.

SMITHS

SMITHS INDUSTRIAL INSTRUMENTS LTD

CRICKLEWOOD WORKS, LONDON, N.W.2

The Industrial Instrument Division of S. Smith & Sons (England) Ltd.

188-211

IT'S A "CRESSALL-PRODUCT"

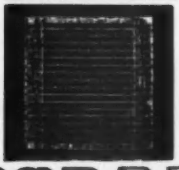
IN ADDITION TO A COMPREHENSIVE RANGE OF STANDARDISED SIZES, SPECIAL TYPES ARE MADE AT SHORT NOTICE

—

Send particulars of your requirements to our Technical Service Dept.

—

ASBESTOS WOVEN WIRE RESISTANCE NETS



CRESSALL

Registered Trade Name of

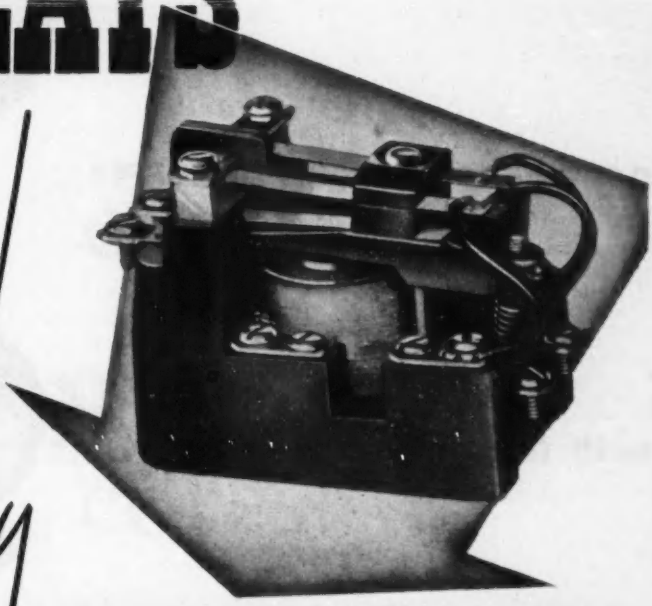
THE CRESSALL MANUFACTURING CO LTD

Tower Street, Birmingham 19

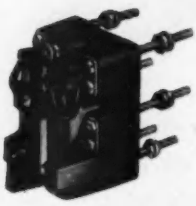
Telephone: ASTon Cross 2666 (3 lines)

Telegrams: "OHMIC, Birmingham"

RELAYS



by



ARROW

THE relay is an outstanding example of the sound mechanical and electrical design which has characterized ARROW products for so long. Every relay is individually produced and tested to give long and *silent* service.

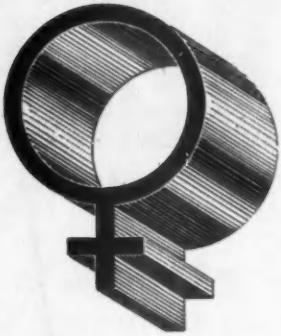
Thirty different circuit arrangements are offered with contact ratings up to 440 v. AC. Operating coils range from 6 to 550 volts.

ARROW relays are available for surface and back of panel wiring or enclosed as illustrated.

Write ***NOW*** *for full details.*

HANGER LANE · EALING
LONDON · W.5
Telephone: Perivale 4451

ARROW ELECTRIC SWITCHES LTD



***now make the most of* COPPER**

with the help of the CDA...

Copper is once again freely available for unrestricted use. The choice of the right grade or alloy—and its use in the right way—saves time, money and material. The C.D.A. exists to help you with expert advice on any of the varied uses of copper and with technical publications, obtainable on application—all free of charge.

COPPER DEVELOPMENT ASSOCIATION

KENDALS HALL · RADLETT · HERTS · TEL: RADLETT 5616

RTB

RICHARD THOMAS & BALDWINS LIMITED

C cores AND SPIRAL cores

MANUFACTURED FROM

Alphasil

GRAIN-ORIENTED

LOW LOSS

TRANSFORMER STEEL STRIP

ALL MATERIAL MADE IN ENGLAND

COOKLEY WORKS, BRIERLEY HILL, STAFFS.

Head Office : 47 Park Street, London, W.1

SWIRLUX direct-to-dealer distribution introduces

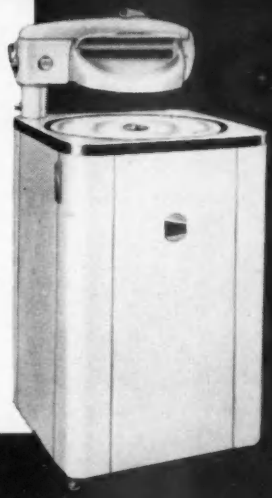
REDUCTION price

NEW PRICE of the SWIRLUX 503

£48-15-0

Plus Purchase Tax £19 . 0 . 3

- Full size Acme POWER wringer.
- 10 lbs. dry weight capacity.
- Empties easily and quickly by power pump and hose.
- Exclusive SWIRLUX agitation.



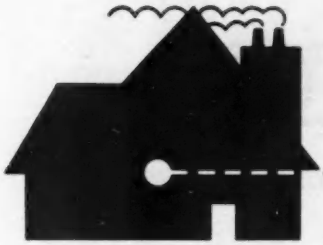
SWIRLUX

All enquiries should now be addressed to the sole manufacturers :

UNIVERSAL BOILERS & ENGINEERING CO. LTD.

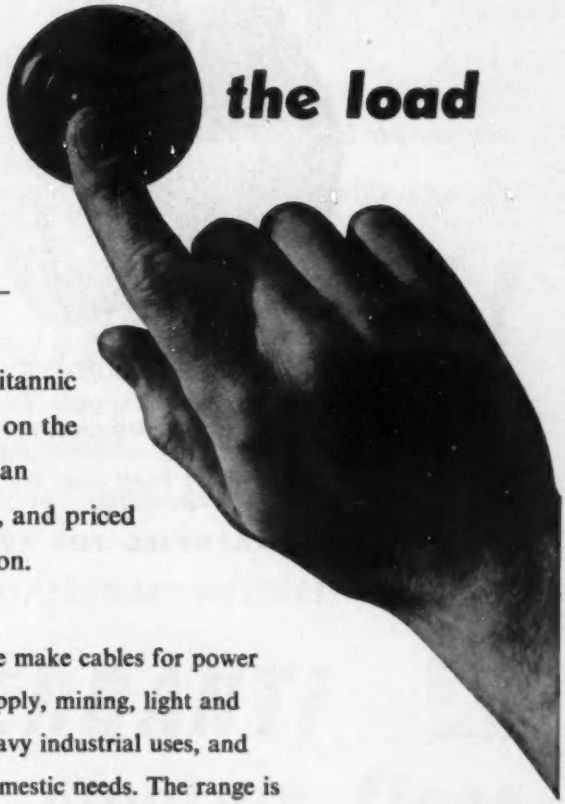
Fulledge Works, Burnley, Lancashire. Phone : BURNLEY 3121

n.d.h. 2384



Britannic Cables

carry the load



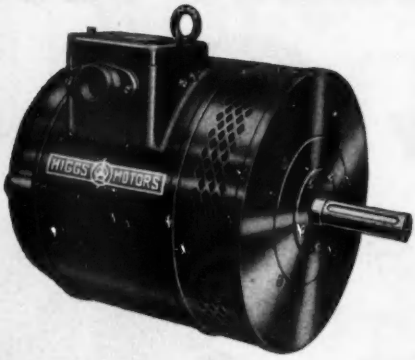
The hand touches a switch, current flows—for light, heat, power, radio, television . . . Britannic dependable cables are on the job! Fine products of an independent company, and priced to meet any competition.

We make cables for power supply, mining, light and heavy industrial uses, and domestic needs. The range is always extending.

BRITANNIC ELECTRIC CABLE & CONSTRUCTION CO LTD · IVER · BUCKS

B

TRADE +
HIGGS MOTORS LTD
CHAIRMAN WALTER F HIGGS M I E E
BIRMINGHAM 6 MARK ENGLAND



FLANGE MOUNTING

Specifically designed for motorising self-contained units, these machines are available in all types and enclosures.

GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Cardiff, Dundee, Glasgow, Leeds, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton

ADVERTISING

Ferranti Radiant Electric Fires will again be advertised to the public this Autumn. An entirely new range of these superb

STARTS

fires is available and leaflets will be supplied on request. Advertising will appear regularly in the following journals:

THIS MONTH!

IDEAL HOME · HOUSE & GARDEN · HOMES & GARDENS · PUNCH

Be ready to display and sell FERRANTI Fires

FIRST, FOREMOST, HOTTEST

FERRANTI

radiant electric fires

FERRANTI LIMITED, MOSTON, MANCHESTER, 10

More power behind your fitter's elbow

PORTABLE power saws, motorised - **£27.10.0.** Stock delivery in all sizes up to 9" capacity. Abrasive disc cut-off machines.

Pillar and bench drilling machines, all capacities up to 2". Illustrated, the Swedish Arboga drill 1" capacity, No. 3 Morse spindle, built-in motor all geared. No belts.

BENCH power saws (illustrated) 3½" capacity, motorised complete **£37.0.0** Belt drive at **£20.0.0**

Fitted MILLING TABLE **£164.17.0**
With normal table **£113.2.0**
Four Speed model **£99.2.0**

PRODUCTION PROMOTION

94 CAMDEN ROAD, LONDON, N.W.1 GULLIVER 6006

IMPORTANT ANNOUNCEMENT TO AMBITIOUS ENGINEERS

THE British Institute of Engineering Technology and its associated organisations which for nearly a quarter of a century have offered unrivalled facilities for technical training by the Home Study Method, are making an important announcement in the *Daily Express* on Tuesday, August 18th. Every industrialist knows that the demand and the opportunities for technically-trained men are greater than ever before; if Britain and the Commonwealth countries are to play their full part in the world of today and tomorrow, there must be an adequate supply of technically-trained men able to accept positions of responsibility.

The achievements of B.I.E.T. in helping to provide these much-needed technicians have been widely praised by leading Statesmen, Industrialists, Scientists, and Educationists. The B.I.E.T. wishes to make its services known to all those ambitious men who have not yet received a copy of "ENGINEERING OPPORTUNITIES"—a 144-page book distributed free of charge which gives up-to-the-minute information about the opportunities available, salary scales, etc., and, in addition to describing our Advisory and Appointments Departments, outlines the widest range of modern Home Study Courses in all branches of Engineering, Building, etc. Accordingly, we have decided to make a half-page announcement in the *Daily Express* on Tuesday, Aug. 18th.

Every reader of this advertisement may apply for a free copy of "ENGINEERING OPPORTUNITIES" and advice about his future career. May we remind employers that their future technicians would find much helpful information in this book.

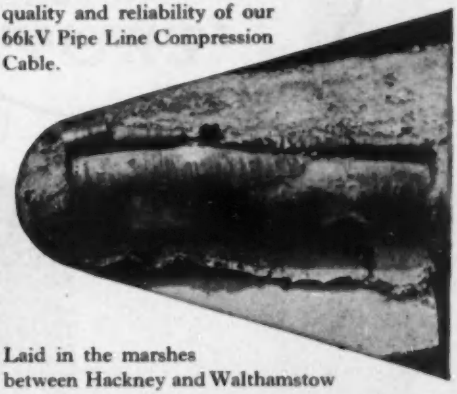
THE BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY
339A, SHAKESPEARE HOUSE, 17-19, STRATFORD PLACE, LONDON, W.1

See half-page advertisement on TUESDAY, AUGUST 18th in

THE DAILY EXPRESS

BULLDOZED . . .

These pictures tell a story of which we at Enfield are naturally proud—a tribute to the quality and reliability of our 66kV Pipe Line Compression Cable.



Laid in the marshes between Hackney and Walthamstow in 1932, this cable has given twenty years' service —and is good for many more years, as was proved recently when it was accidentally damaged by the over-zealous driver of a bulldozer!

. . . but unbroken

Despite rough treatment, the steel pipe containing the cable was not fractured (shown in the right-hand picture), neither did the cables suffer damage—

THE CABLE CONTINUED TO CARRY ITS FULL LOAD

Only the wrapping was stripped off the pipe at the point of collision, and this was quickly repaired.

ENFIELD *PIPE LINE COMPRESSION CABLES*

Enfield

ENFIELD CABLES LIMITED · BRIMSDOWN · MIDDLESEX

HOWard 2661 (Works) London Office: HOLborn 9292

(E23)

Tudor
SWITCH TRIPPING EQUIPMENT

Here is a completely reliable equipment, designed by Tudor for small installations where the battery is required only for tripping circuit breakers, usually at a pressure of 24 or 30 volts.

The cabinet, which may be of wood or steel, houses the battery and accessories and incorporates a trickle charge rectifier and test circuit.

Full details in TUDOR SWITCH TRIPPING Leaflet No. 85
Sent on request

T.113

Tudor BATTERIES

THE TUDOR ACCUMULATOR COMPANY LTD · 137 VICTORIA STREET · LONDON · SW1

INSIST ON **Grubb** HEATING UNITS

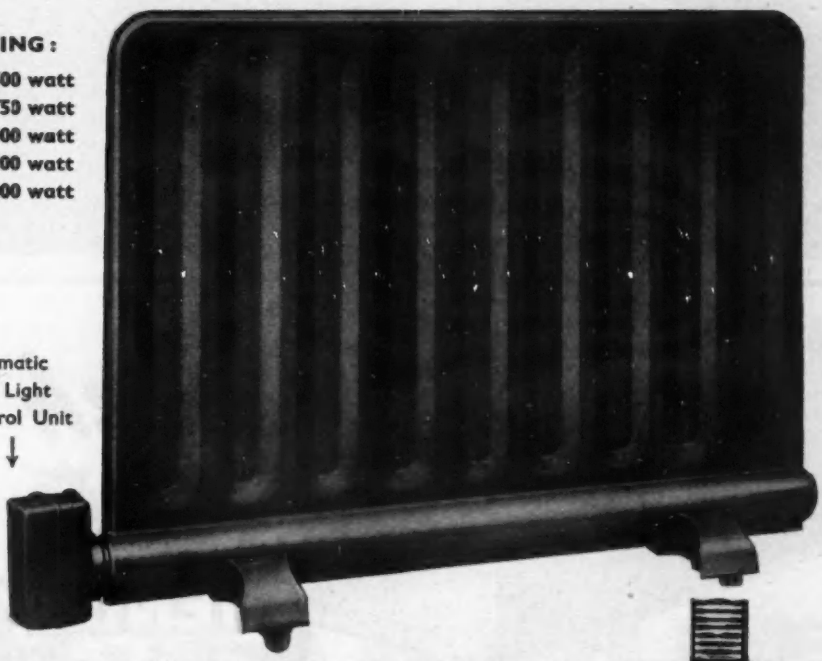
OIL HEATED All-Electric SPACE

RADIATORS

Thermostatically Controlled

RATING:

500 watt
750 watt
1000 watt
1500 watt
2000 watt



Automatic
Pilot Light
Control Unit

With Castors, "Silent Dome" Feet or for Wall Mounting

Finished in

CREAM, GOLD, HAMMERED SILVER, GILT or EAU-DE NIL

Guaranteed for Twelve Months

Write today for Price Lists, Brochures and Trade Terms to Sole Manufacturers:

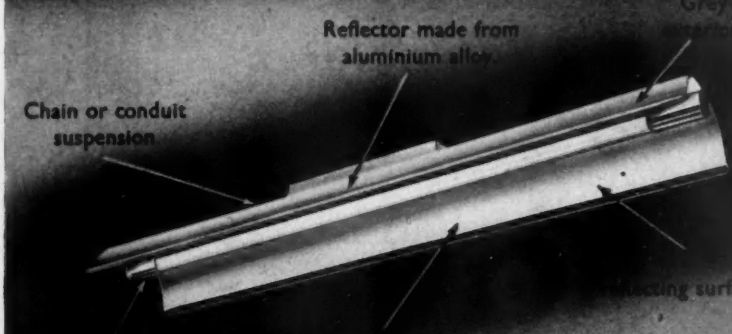
GRUBB ENGINEERING COMPANY LTD.

BIRMINGHAM 12 **Export Enquiries Invited**

SMART & BROWN (ENGINEERS) LIMITED

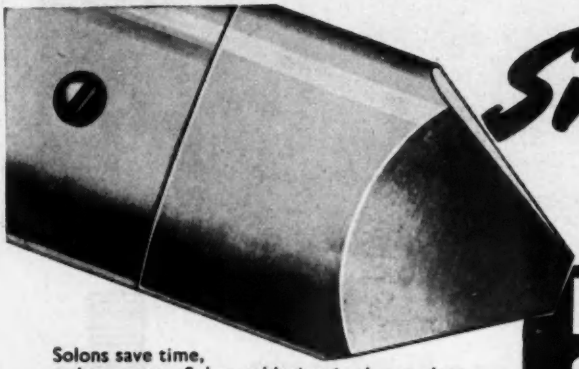
SB

FLUORESCENT LIGHTING



LIGHT WEIGHT TROUGH FITTING
Cat. No. OT 15

3EF3

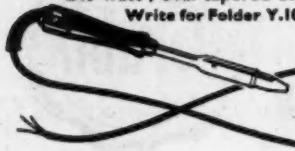


Switch on to

HENLEY SOLON TRADE MARK ELECTRIC SOLDERING IRONS

Solons save time, reduce costs. Solon soldering is always clean, reliable and simple. Five models, in voltage range 100-250 ; each with 6 feet Henley flexible.
65 watt ; oval tapered or round pencil bits.
125 watt ; oval tapered or round pencil bits.
240 watt ; oval tapered bit.

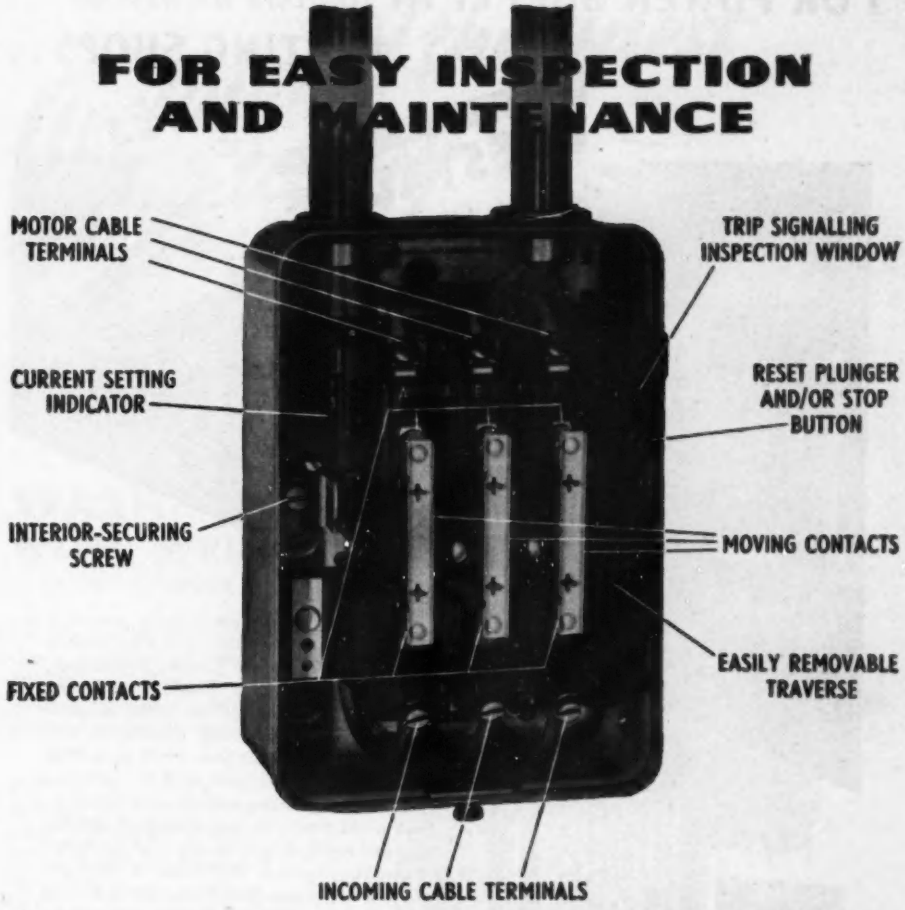
Write for Folder Y.10



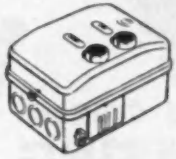
W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
51-53 HATTON GARDEN, LONDON, E.C.1.

THE CRABTREE TYPE B-15 AIR-BREAK STARTER

FOR EASY INSPECTION AND MAINTENANCE



CRABTREE



A name synonymous with Progress in Accessories and Switchgear

"Crabtree" (Registered) C.671/189 Advt. of J. A. Crabtree & Co. Ltd., Walsall, Staffs., England

FOR POWER SUPPLY IN *famous industrial* PLATING SHOPS..

WESTINGHOUSE WESTALITE

Typical oil-immersed rectifier (output 7.5 volts at 1,000 amps).

For the electrolytic processes at the Ellesmere Port factory of British Coated Sheets Ltd., a rectifier capacity of 50,000 amperes at 7 volts is provided by ten 5,000 ampere "Westalite" oil-immersed rectifiers. For each of the two plants that are in operation five units are used, one each for alkaline cleaning and pickling and three for plating. Each plant has a normal output of 250-300 tons per week of steel sheets with a deposit of zinc varying from ·00005 ins. to ·0003 ins. or more to protect them from rusting during storage. The entire plant was installed by The Electro Chemical Engineering Co. Ltd., of Weybridge. (Photographs reproduced by courtesy of "Electrical Review.")

WESTINGHOUSE WESTALITE

PLATING RECTIFIERS

Dept. E.T.17

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., 82 YORK WAY, KING'S CROSS, LONDON, N.1

Acclaimed the finest value to-day

Burco

E900

CABINET TYPE ELECTRIC

WASHBOILER WITH WRINGER

AVAILABLE IN CREAM OR WHITE

For the woman who wants an efficient, good-looking washing unit, but cannot afford an all-electric washing machine, this BURCO Washboiler provides the answer.

Sell this new model E900 with or without the Acme Wringer—if the housewife already possesses a 14-in. Wringer, this will fit on the back of the boiler.

The story of BURCO efficiency is unchanging—merely adapted to present-day needs for practicability with economy.

Offer this new BURCO model now and take advantage of this timely feature!

NO PURCHASE TAX

Advertised [in the leading public] papers

ENQUIRE NOW

BURCO LTD · ROSE GROVE BURNLEY · LANCS

Also makers of the famous Burco all Electric Washing Machine.

GENERALLY SPEAKING . . .

as a butt is

to a bucket . . .

— so is a GENERAL V.I.R. lead-sheathed and armoured cable to a GENERAL cotton-and-silk Flexible. And these are merely two of the wide range of cables manufactured by GENERAL for every job of carrying electric current. In the matter of capacity, GENERAL CABLES have not only *all* the answers but the right ones . . . cables of quality, strength and durability justifying our claim that "General Cables today prevent trouble tomorrow."

GENERAL CABLES

MADE AT LEATHERHEAD

V.I.R. Taped, Braided and Compounded.
V.I.R. Lead Sheathed.
V.I.R. Tough Rubber Sheathed.
V.I.R. and Armoured.
Polythene insulated P.V.C. Sheathed Cables and Flexibles.
T.R.S. Flexibles.
Cotton and Silk Flexibles.
Workshop Flexibles.
Trailing Cable.
Welding Cable.
H.S.O.S. Cable.

The General Cable Manufacturing Co. Ltd., Leatherhead, Surrey. 'Phone: Leatherhead 3021/4.
Grams: "Isolde" Leatherhead.
Depots at: 204/206 Newhall St., Birmingham. 54a Newton St., Manchester. 55/63 Washington St., Glasgow, C.2.

For the ELECTRICAL INDUSTRY— the smoothest cutting Taps. Make this definite saving in production costs. Tests in the Electrical Industry have proved that the use of "HARRIS" Cut Thread Taps, made from the finest Tool Steel in the World, result in less cost per tapped hole. All of our Cut Thread Taps are manufactured with the care and accuracy which is associated with the name of "HARRIS".

HARRIS

CUT THREAD TAPS

JOHN HARRIS TOOLS LTD., WARWICK Phone 741 (6 lines

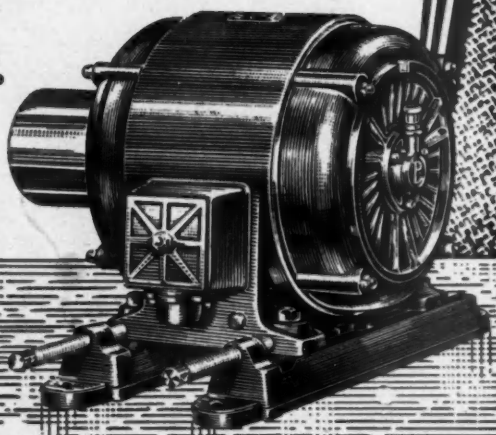
MAKERS OF A.C. ELECTRIC MOTORS FROM 0·125 TO 250 H.P.

BROOK

the name you can trust with your Electric Motor requirements.

Control Gear too . . . automatic and hand-operated types.

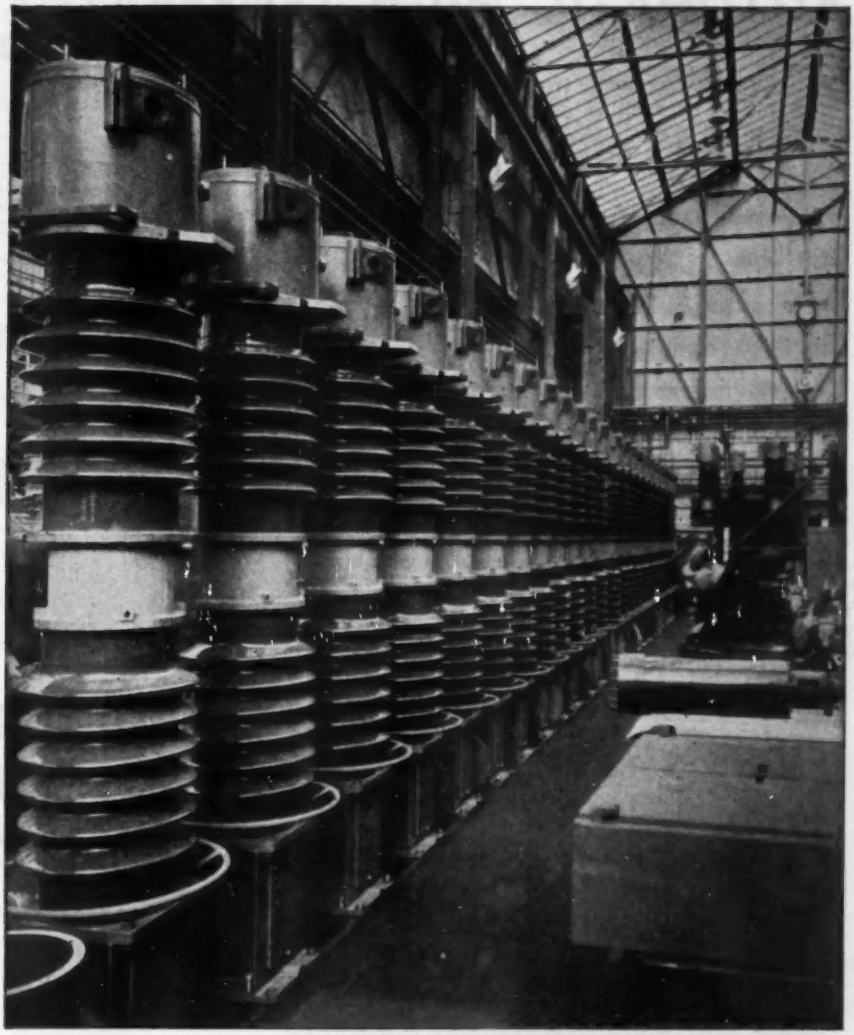
STANDARD
PROTECTED



BROOK
MOTORS
Ltd

HUDDERSFIELD

I. LT. 249

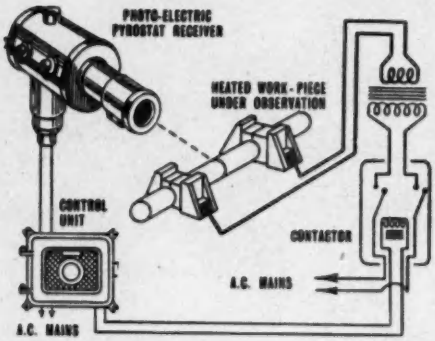


66-kV small-oil-volume circuit-breakers

Reyrolle

A. REYROLLE & COMPANY LIMITED, HEBBURN • CO. DURHAM

AUTOMATIC HIGH TEMPERATURE HEAT CONTROL



The difficulty of controlling temperature when employing direct resistance or eddy current heating in butt welding, up-setting and similar operations is well known.

The Radiovisor Pyrostat Controller provides automatic and instantaneous control by measuring the visible light radiations emitted from the heated workpiece. Radiations from the workpiece fall on to a photo-electric cell which converts light intensity into electrical energy, and at the desired temperature the heating current to the workpiece is automatically switched off.

The photo-electric cell which is instantaneous in response, is mounted in a robust receiver housing, which carries an infra red filter to exclude all light rays other than those radiated from the hot workpiece.

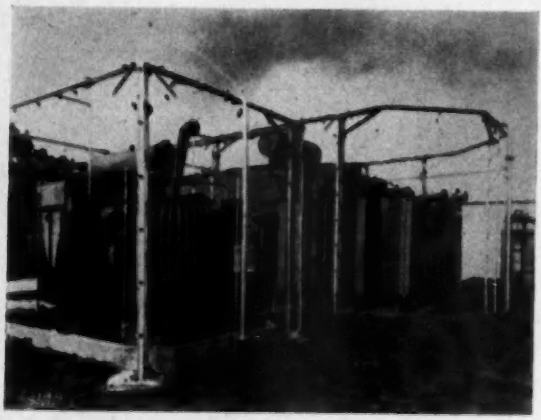
Not being in physical contact with the heated workpiece the photo-electric cell is unaffected by the intense heat. Once set, the Radiovisor Pyrostat Controller requires no further attention and does not interfere with the operator or operation. The only reminder of its presence is greater efficiency and increased production.

RADIOVISOR PHOTO-ELECTRIC AND ELECTRONIC CONTROLS INCLUDE:

FLAMESTAT FLAME FAILURE CONTROL
HOPPER AND BUNKER LEVEL CONTROL
PROTECTIVE GUARD RAY
INDUSTRIAL SMOKE DENSITY INDICATOR
FACTORY LIGHTING CONTROL
ESCALATOR AND LIFT CONTROL
COUNTING AND BATCHING UNIT
PRINT REGISTRATION
SMOKE ALARM
SMOKE DETECTOR FIRE ALARM
INVISIBLE RAY BURGLAR ALARM
AUTOMATIC DOOR OPENING

RADIOVISOR
EST. 1927
THE FIRST NAME IN ELECTRONIC CONTROLS

RADIOVISOR PARENT LIMITED · 1 STANHOPE STREET · LONDON · N.W.1 *Telephone: EUSton 5905/6*
Makers of Electronic Controls for 25 years



PROTECTING TRANSFORMERS & REACTORS AGAINST FIRE...

This photograph (courtesy British Thomson-Houston Co. Ltd.) shows one section of the equipment at the B.E.A. Distribution Centre, Cairns Road, Bristol. Illustrated are one 18,000 kVA transformer and one 1,800 kVA reactor, protected by the "Mulsifyre" system

MATHER & PLATT LIMITED
PARK WORKS-MANCHESTER 10 · PARK HOUSE, GREAT SMITH ST, LONDON S.W.1

BICC ALUMINIUM CONDUCTOR CABLES

for all standard voltages

Many engineers are interested in the use of Aluminium for power cable conductors. BICC can manufacture such cables for all standard voltages and a satisfactory jointing technique has been developed.

Detailed jointing instructions and further technical information are readily available on request. Cables of this type have been installed by the Yorkshire Electricity Board on the Sheffield Corporation Hackenthorpe Housing Estate.

The World's Largest Cable Manufacturers

BRITISH INSULATED CALLENDER'S CABLES LIMITED
21 BLOOMSBURY STREET, LONDON, W.C.1

The Vital Link . . .

. . . with safety in the hazardous enterprise of the deep sea trawler is its radio and radar equipment upon which safe navigation depends. Thousands of soldered joints contribute to the efficient functioning of this delicate apparatus. One dry or H.R. joint could mean the breakdown of a circuit, the destruction of the vital link, a perilous voyage.

Faultless Fluxing preserves the Vital Link

Dry or H.R. joints are impossible with Superspeed for the flux is always released in exactly the correct proportion. This faultless fluxing action is achieved by the unique STELLATE core which gives six points of rapid solder collapse. At soldering temperature the activated rosin flux is released immediately for effective spreading and wetting. Superspeed is being used more and more in the production of radio and radar equipment where faultless joints are essential.

Superspeed

"White Flash" *activated rosin-cored solder for general electrical, electronic and telecommunication work and all standard uses. A.I.D. and G.P.O. approved. Complies with M.O.S. Specification DTD 599. In all standard tinflead alloys, 10-22 s.w.g. Also available in a range of coloured cores, indispensable for simple intermediate and final inspection and circuit or operator identification. Samples of Superspeed and the comprehensive Superspeed booklet gladly sent on request. Technical advisers are available for free consultation. Cored and solid solder rings and solid solder washers supplied to customers' specifications.*

MANUFACTURED BY THE **ENTHOVEN** GROUP

Marketed by Enthoven Solders Ltd., Enthoven House, 89, Upper Thames Street, London, E.C.4. Tel. Mansion House 4533

1430 98

NO lamps and tubes are better THAN Osram

The excellence of Osram lamps and fluorescent tubes is assured by G.E.C. 'Quality Control'. Every part, from the basic raw materials, is **proved** to the highest standards. Rigid tests at every stage of manufacture ensure that finished Osram lamps and tubes are uniformly good. These are the methods—evolved by the G.E.C. over nearly 60 years of lamp-making —on which is founded the Osram reputation for reliability.

Always specify Osram the wonderful light

A G.E.C. PRODUCT. THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

An OUTDOOR Circuit Breaker

(PNEUMO-HYDRAULICALLY OPERATED)

IN THE DESIGN of this bulk-oil Circuit Breaker the mechanical construction is simple and generous to ensure permanently satisfactory performance under the most arduous conditions of service.

Built to comply with British Standard 116-1937 (Part 2) it has been subjected to short circuit test and certified for the rating assigned—i.e. 1,000 amps.—750 MVA Breaking Capacity—33 and 38.5 kV.

The illustration left shows a circuit breaker fitted with apparatus for pneumo-hydraulic operation. The circuit breaker may be closed four times in succession without recourse to auxiliary power supply.

As an alternative BRUSH Outdoor Circuit Breakers can be fitted with Solenoid Operating Mechanism.

For full information write TODAY for our NEW Publication No. 41166/A.

BRUSH 33/38.5kV

OIL CIRCUIT BREAKERS

THE BRUSH ELECTRICAL ENGINEERING CO., LTD., LOUGHBOROUGH, ENGLAND

B18

Performance Plus

The effectiveness of Ivor Soot Blowers is amply demonstrated in the figures, quoted by the British Electricity Authority, of British Power Station efficiencies for the calendar year 1952.

1.	**LITTLEBROOK 'B'**	**29.95%**
3.	**PORTOBELLO H.P.**	**29.46%**
4.	**SKELTON GRANGE**	**29.19%**

3 IN THE FIRST 4

EQUIPPED WITH IVOR SOOT BLOWERS

IVOR

IVOR POWER SPECIALTY CO., LTD.

29 WOBURN PLACE, LONDON, W.C.1
and ABERDARE, GLAMORGAN, S. WALES

RECTIFIERS

WITH METAL RECTIFICATION

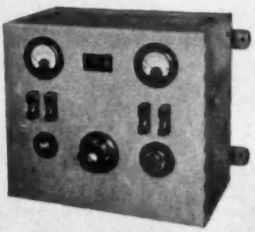
For —

BATTERY CHARGING, ENGINE STARTING, LIFT CONTROL, SIGNALS, COMMUNICATIONS, LABORATORIES, ETC.

WE SHALL BE GLAD TO QUOTE FOR EQUIPMENT MADE TO SUIT YOUR OWN PARTICULAR PURPOSE

PROMPT DELIVERY

CAYSON



CAYSON ELECTRICS LTD
QUEENS RD. WATFORD
Tel: WATFORD 7156 & 7177

ON THE SPOT!
ARCHWAY 2155

FOR CONTROL OF LIGHT, HEAT AND MOTION IN ITS MANY APPLICATIONS CONSULT

RESISTANCES LTD.
30, OXFORD RD. LONDON N.4.
Telephone ARCHWAY 2155

Volex

PLASTIC

SHADES

WHITE FINISH

Many of the leading industrial concerns, County Councils, Public Works Departments and Electricity Boards, etc. specify and fit "Volex" Plastic Shades because they know that for most efficient lighting, pleasing appearance and robust design they fulfil every requirement.

Send for illustrated leaflet giving full particulars of wide range.

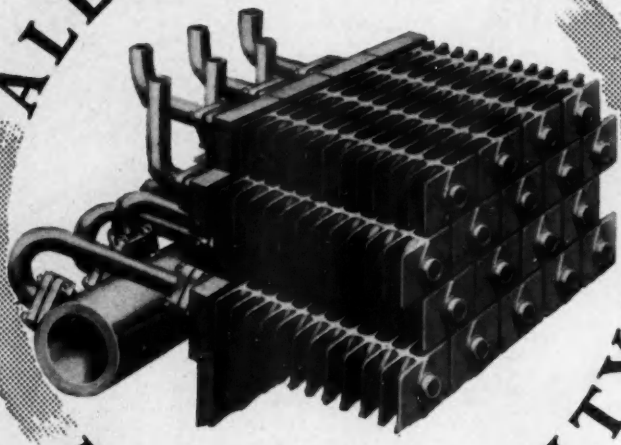
"VENTICAL" (Regd.) PATTERNS

Separate ventilated gallery. Provides a high degree of illumination without glare and widely used by leading authorities.

VOLEX ELECTRICAL PRODUCTS LTD
SALFORD 6

Telephone: PENdleton 4373 Telegrams: "VOLEXPROD" Salford 6

ALL-ROUND ACCESSIBILITY



Type 12. *Steel tubes with cast-iron gills: suitable for the highest pressures.*

Green's Premier Diamond Economisers, Types 25 and 12, feature the famous gilled cast-iron tube or sleeve construction which permits better access for cleaning and all-round inspection of every part.

GREEN'S ECONOMISER

E. GREEN & SON LTD · WAKEFIELD

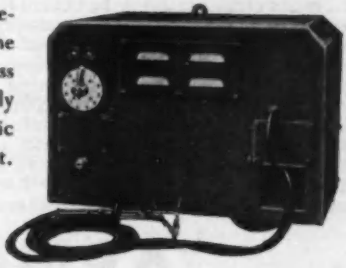
Makers of economisers for more than one hundred years

GE 104

. . . just the job for M-V Atomic Hydrogen welding equipment

Broken shanks of drills and reamers, fractured collets and a whole host of other workshop production tools can be repaired with M-V atomic hydrogen welding equipment. The same equipment is also used for the manufacture of press tools, by depositing tool steel on mild steel blanks exactly where required. Full technical details of the M-V atomic hydrogen welder and its applications are available on request.

Metrovick Atomic Hydrogen Welding Equipment, comprising 50 ampere Welding Set and Torch connected by cable and pipe.



METROPOLITAN-VICKERS ELECTRICAL COMPANY LIMITED, TRAFFORD PARK, MANCHESTER, 17
Member of the A.E.I. group of companies

METROVICK *Equipment for More Efficient Welding*

J/E004

Over 1,000,000 in Africa

. . . over 2 million in use in the United Kingdom and Eire; a million or so in Australasia; half-a-million in Scandinavia; another half-a-million in the rest of Europe and elsewhere—these figures speak for themselves. During the few years that "ARMOURLIGHT" Toughened Glass Insulators have been available, the demand for them has become world wide.

Electrically and mechanically they are stronger than any other type of insulator. Laboratory tests and experience in the field have shown them to be proof against puncture by lightning surges and highly resistant to power-arcs. Should failure of the insulator occur, the result is a complete break-up of the glass, but the design is such as to ensure the safety of the conductor, and the damaged unit can easily be seen from the ground. Any "ARMOURLIGHT" insulator that looks sound must be sound.

For technical advice and literature, write to Pilkington Brothers Limited, Insulator Sales Dept., Ravenhead Works, St. Helens, Lancs.

"ARMOURLIGHT"

High Voltage Toughened Glass Insulators

BRITISH GLASS PB

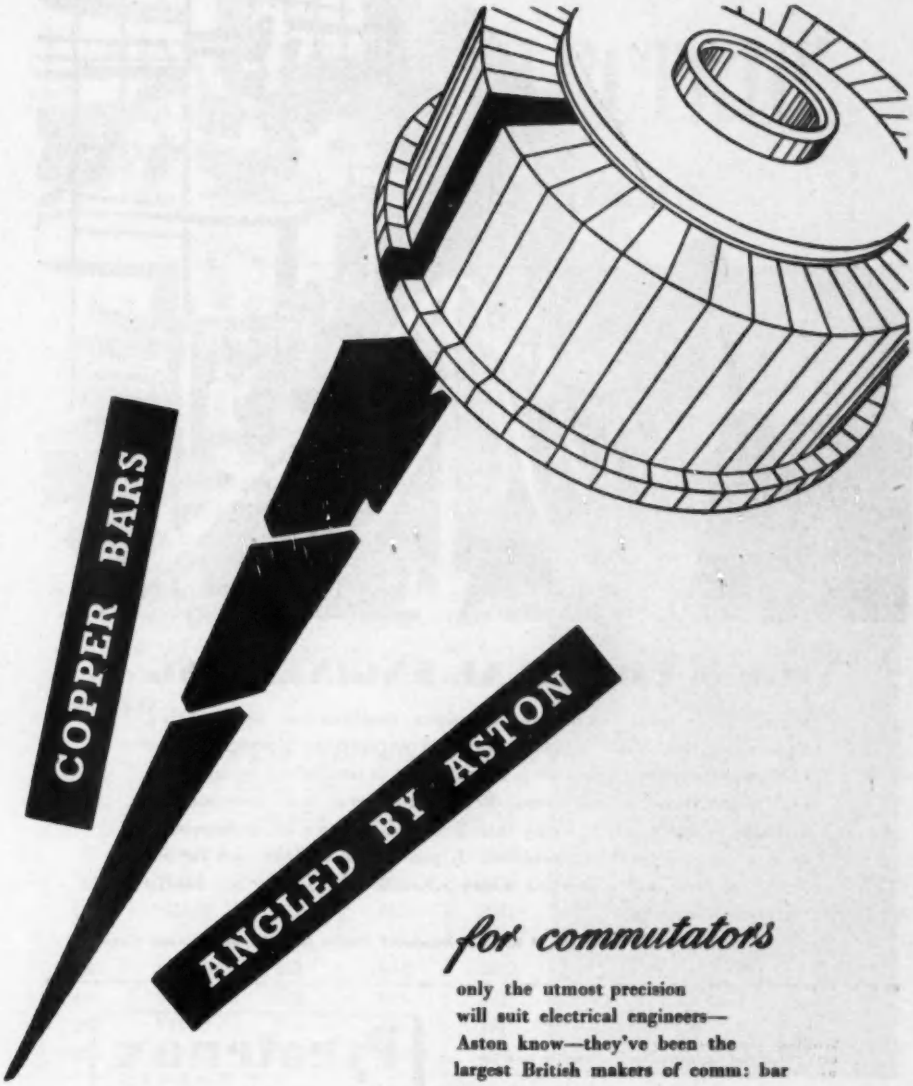
PILKINGTON BROTHERS LIMITED

St. Helens, Lancs., or Selwyn House, Cleveland Row, St. James's, London, S.W.1

Tel: St. Helens 4001, Whitehall 5672-6

HVI.3

"ARMOURLIGHT" is the registered trade mark of Pilkington Brothers Ltd.

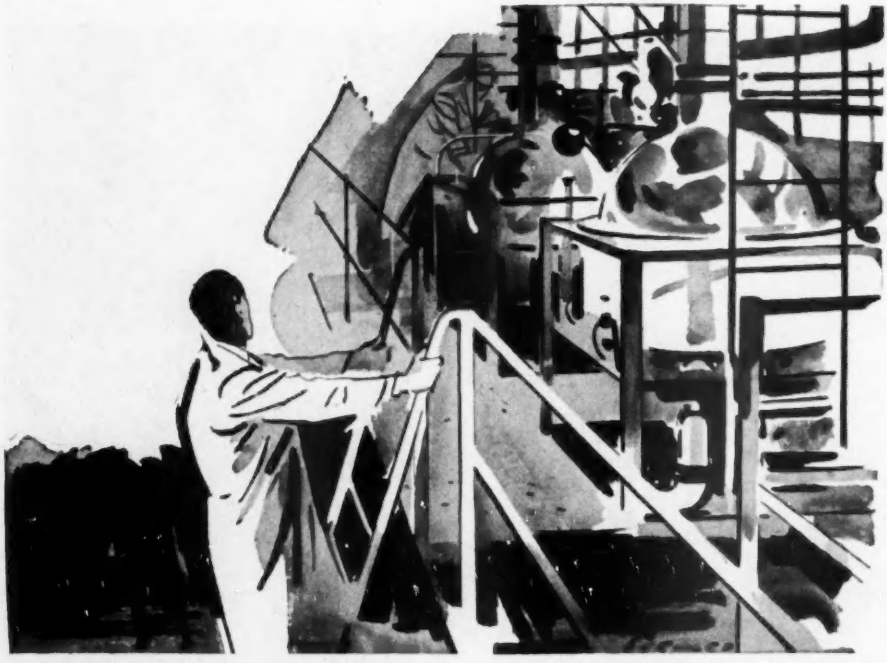


for commutators

only the utmost precision
will suit electrical engineers—
Aston know—they've been the
largest British makers of comm: bar
for a long time.

ASTON CHAIN AND HOOK CO. LTD · BROMFORD LANE · BIRMINGHAM 24

Telephones: ERDINGTON 2235/6/7 *Telegrams: "Chainwork" Erdington 5 & B (M 19)*



*M.I. *in* CHEMICAL ENGINEERING

It is a fact that, owing to a unique combination of qualities, Pyrotenax M.I. electric cables are used extensively throughout the Chemical Industry. For here is a cable that is unaffected by moisture and most corrosive conditions. Being all-mineral it is fire-resistant, virtually indestructible, easily installed and requires no maintenance or renewal — a sound investment. ***If you are an engineer ask for our Technical Data, but if you are a non-technical man ask for our booklet "Current Carrying."***

** Mineral Insulated Cables for Distribution and Control*

PYROTENAX IS AN EXCLUSIVE TRADE MARK NAME AND MUST ONLY BE USED TO DESIGNATE CABLES AND OTHER PRODUCTS MANUFACTURED BY THIS COMPANY AND ITS ASSOCIATES

Pyrotenax CABLES

PYROTENAX LIMITED HEBBURN-ON-TYNE
PHONE: HEBBURN 32244/7

LONDON: Phone. ABBEY 1654/5 • **BIRMINGHAM**: Phone. MIDLAND 1265
GLASGOW: Phone. CENTRAL 2238 • **MANCHESTER**: Phone. BLACKFRIARS 6946

GD63

'ENGLISH ELECTRIC'

h.r.c. fuse links

ASTA CERTIFIED

The Association of Short Circuit Testing Authorities (ASTA) issues Certificates of Rating for fuses giving satisfactory performance when tested in accordance with the appropriate clauses of British Standard 88.

The complete range of 'ENGLISH ELECTRIC' Type 'T' High Rupturing Capacity Non-Deteriorating Cartridge Fuse Links has been ASTA certified for Category of Duty 440AC4 to the 1939 edition of B.S.88 (the highest category at that time) and for Categories of Duty 440AC4 and 440AC5 representing 25 MVA and 35 MVA respectively to the 1947 edition of B.S.88.

RATING AMPS.	LIST NOS.	ASTA CERTIFICATE NUMBERS		
		B.S.88: 1939	B.S.88: 1947	
		440 AC 4	440 AC 4	440 AC 5
30	T1A30	617	1016	2074
60	T1S60	616	903	2022
100	TC100	615	932	2021
200	TF200	251	933	2033
300	TKF300	252	934	2032
400	TM400	629	935	2031
500	TT500	354	936	2025
800	TLT800	353	2098	2026

The ENGLISH ELECTRIC Company Limited

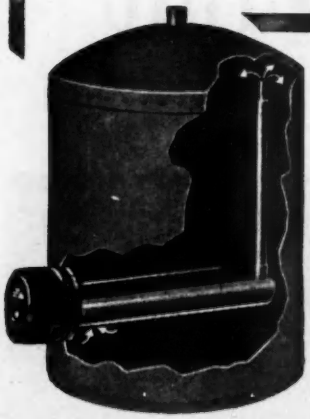
QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Fusegear Works: East Lancashire Road, Liverpool 10

Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

F.7

Have you a water heating problem?



. . . solve it with "Dunlow" electric Immersion Heaters and Circulators

Side Entry—Top Entry and External Types can be supplied. Full information on request

The easiest heater to fit
Side Fixing Type Circulator with mechanical flange 2, 3 and 4 *kw*

Phone: Bell 1961
Grams: "Immerser," Glasgow

DUNCAN LOW LIMITED
293 BELL STREET, GLASGOW, C4

Dunlow

Moulded Products Range

For full details and prices ask for catalogue No. OHL/31/TE.

METWAY ELECTRICAL INDUSTRIES LTD., KING STREET, BRIGHTON

'VARIAC' voltage regulating transformers

Reg'd Trade Mark

'VARIAC'—the original continuously-adjustable auto-transformer—is the ideal device for controlling any a.c. operated equipment. VARIACS not only supply perfectly smooth control of voltage from zero, but on some patterns, there is even an "over voltage" feature. Illustration left shows the type 200 C.U.H. 'VARIAC.'

Left: Type 50-B 'VARIAC'

Right: Type 100-R 'VARIAC'

SERIES 200 'VARIAC' TRANSFORMERS

SPECIFICATIONS

Type.	Load Rating	Input Voltage	Current		Output Voltage	No-Load Loss	Net Price £ s. d. *
			Rated	Maximum			
200-CM } 200-CU }	860 va.	115 v.	5 a.	7.5 a.	0-135 v.	13 watts	7 17 6 / 6 15 0
200-CMH } 200-CUH }	580 va.	230 v. / 115 v.	2 a. / 0.5 a.	2.5 a. / 2.5 a.	0-270 v. / 0-270 v.	20 watts / 20 watts	9 15 0 / 8 5 9

* All 'VARIAC' prices plus 20% as from 23rd Feb. 1952

PROMPT DELIVERY

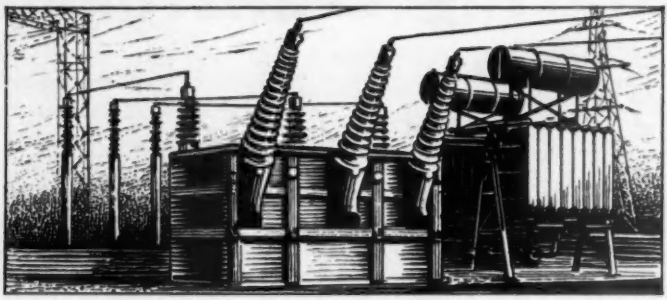
Full details of this and other models in the 'VARIAC' range are contained in Catalogue V549, which will gladly be sent on request.

CLAUDE LYONS LIMITED

ELECTRICAL & RADIO LABORATORY APPARATUS, Etc.

180 Tottenham Court Road, London, W.1; and 76 Oldhall Street, Liverpool, 3, Lancs.

BRITISH SUPER GRID



SIX

B T-H

120-MVA, 275-kV
TRANSFORMERS
are being supplied

•

The FIRST is installed at STAYTHORPE

The other FIVE are for
STAYTHORPE (1) · SHEFFIELD (2)
LEEDS (2)

THE
BRITISH THOMSON-HOUSTON
COMPANY LIMITED · RUGBY · ENGLAND

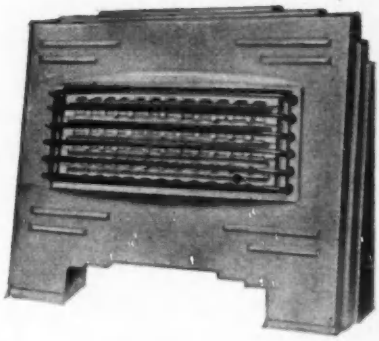
Member of A.E.I. Group of Companies A4653N

MEMRAY

Swivel reflector fire beautifully designed and built. Robust cast construction—efficient reflector and guard.
Ratings 1 or 2 kW.

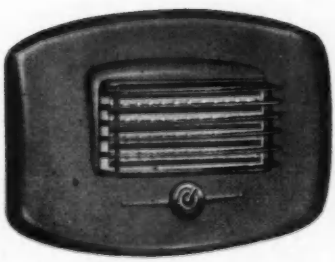
MEM

brings you Britain's fastest-selling fires



MAYFAIR

Clean well proportioned design and sturdy construction.
Ratings 1 or 2 kW.



PANEL FIRES
(Outset Pattern)

An attractive model for mounting direct on a wall with or without surround.
Made in 1 and 2 kW bar type.

REFLEX

A well-made fixed reflector fire, with wide base and neat built-in guard.
Ratings 1 or 2 kW.

MEM Fires are available in a range of attractive colour finishes.

MEM

Here comes the new MEM convector

This portable MEM convector is a delightfully simple design equally suitable for home, shop, office or public building. Exceptionally slim it makes the minimum demand on floor area and has smooth unbroken surfaces for easy cleaning. The attractive finish is bronze with burnished copper surround to the protective grille. Made in two ratings and available with or without thermostat control.

Send for the new MEM convector folder List No. 339

MEM

MIDLAND ELECTRIC MANUFACTURING CO. LTD.

TYSELEY, BIRMINGHAM, 11. *Branches in London and Manchester.*

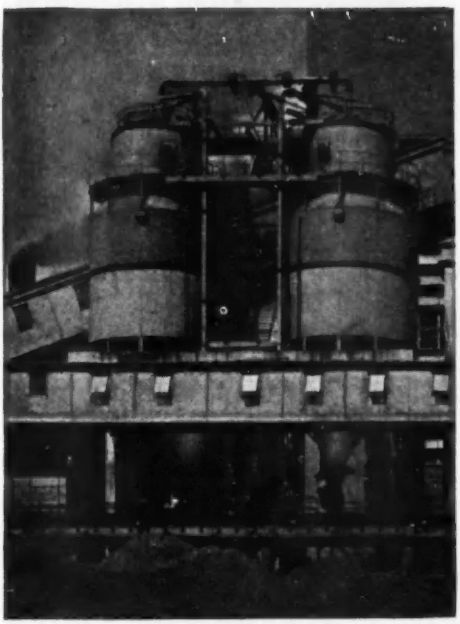
SAVE COST

with B.V.C

"BRITISH VACUUM CLEANER"

FLUE DUST AND RIDDLINGS

EXTRACTION PLANT



● The Nation's need demands that Coal shall convert every possible fraction of its energy into power for production. The vital contribution that efficient combustion makes to this end is immeasurably facilitated by B.V.C. Flue Dust Removal Plant. This is the recognised method of keeping steam boilers free from accumulations of flue dust, and ensuring that every ton of coal is used to the best possible advantage by removing and consuming the riddlings.

For Information and Consultation write to Dept. 14

B.V.C. INDUSTRIAL CONSTRUCTIONS LTD

(Subsidiary of the British Vacuum Cleaner and Engineering Co. Ltd.)

Terminal House, 52 Grosvenor Gardens, London, S.W.1. Sloane 9975/8. Head Office: Leatherhead Surrey

C

ELECTRICITY
for more prosperity

PAST

There were only six occasions during each of the past two winters when the demand for electricity exceeded the available supply. In those periods, interruptions by power cuts were brief and affected relatively few people.

The first task of British Electricity—restoration of the pre-war reliability of electricity supply—has, in fact, been substantially achieved. Supply service will improve further in the years ahead.

PRESENT

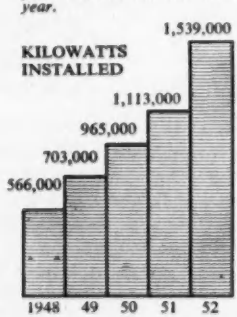
Today there is plenty of electricity for all consumers, industrial, commercial and domestic. The power stations are producing only about half their full potential output during the working week; at weekends there is a still larger surplus capacity.

FUTURE

This vast potential electricity supply — approximately equal to the 57,000,000,000 units sent out from the power stations last year — is on tap at the touch of a switch.

Five years' Progress

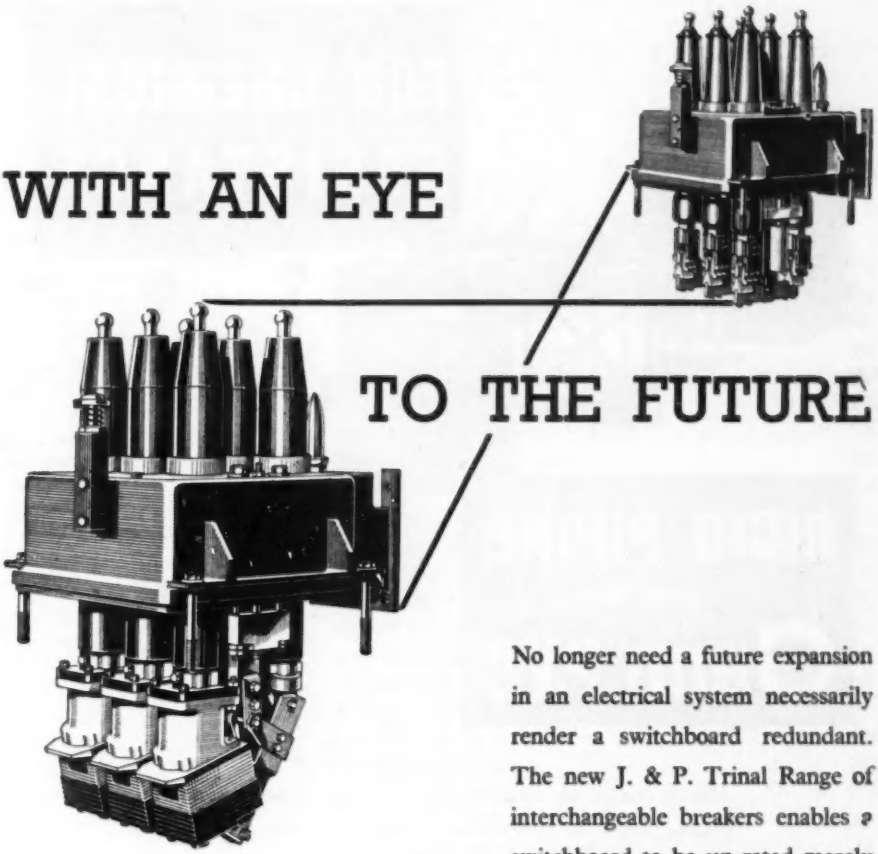
In the five years since the British Electricity Authority came into being, record amounts of new generating plant have been installed each year.



In 1952 there was installed more than twice the pre-war record figure of 759,000 kilowatts.

BRITISH ELECTRICITY

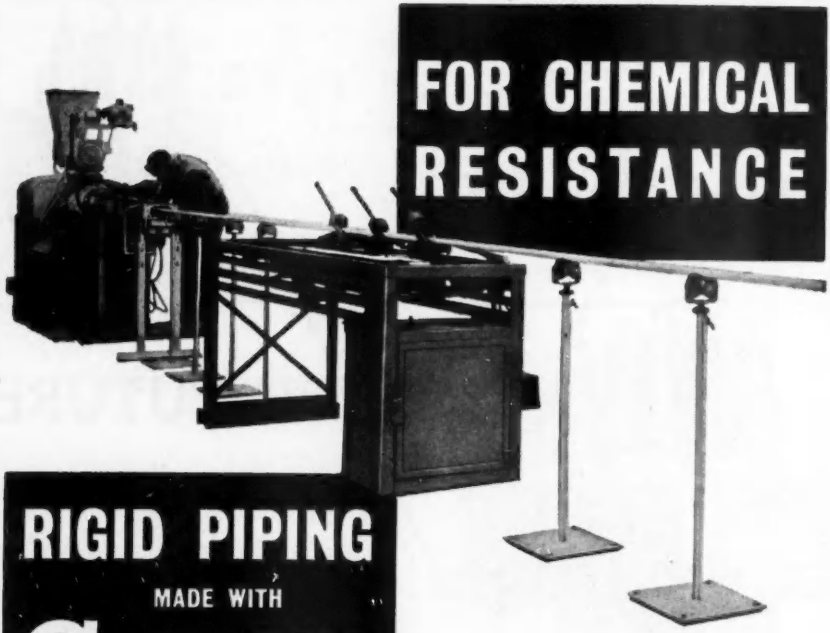
WITH AN EYE TO THE FUTURE



No longer need a future expansion in an electrical system necessarily render a switchboard redundant. The new J. & P. Trinal Range of interchangeable breakers enables a switchboard to be up-rated merely by inserting higher rated breakers. J. & P. standardisation can mean a big financial saving. Ask for Publication SG 86 for full details.

J. & P. Trinal Breakers and Oil Switches conform strictly to relevant B.S. Specifications, including B.S. 116, and are, of course, A.S.T.A. certified where applicable. Maximum rating, 250 MVA at 6.6 kV.

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality



FOR CHEMICAL RESISTANCE

RIGID PIPING MADE WITH Geon PVC

RIGID Geon PVC* is used as conduit and for piping in chemical works, refineries, laboratories, plating shops—in fact, wherever there is chemical attack. This rigid PVC piping is chemically inert, it won't corrode and never needs painting. It is light in weight, is easily shaped and cut, and can be screw threaded, heat welded or joined simply by means of a solvent-sealed push joint. *The photograph shows rigid PVC piping being made by Lacrinoid Products Ltd.*

**Geon PVC materials are polyvinyl chloride plastics.*

Please write for descriptive Booklet 97, free on request.

BRITISH GEON LIMITED

Geon
Polyvinyl Materials

Sales & Technical Service: 21 St. James's Square · London S·W·1 · Tel: Whitehall 9561

"GEON" IS A REG'D TRADE MARK

ELECTRICAL TIMES

Volume 124 No. 3223 13 AUGUST, 1953

PUBLISHED EVERY THURSDAY

Editor and Managing Director:
ROY BALDWIN
M.I.E.E., Barrister-at-Law

Assistant Editors:
J. K. JOHNSON
B.SC. (ENG.), A.M.I.E.E.

K. C. POUNDS
B.SC. (ENG.), A.M.I.E.E., A.C.G.I.

COST COMPARISONS OF INDUSTRIAL LIGHTING, by J. Johnson	277
COOLING TRANSFORMERS ON OVERLOAD	280
OUR READERS' VIEWS	281
FREE DEALINGS IN COPPER	282
REDECORATING IN A FINE PERIOD STYLE	283
FROM AN ENGINEER'S NOTEBOOK	286
THE VOLTAGE OPERATED E.L.C.B.	287
PLAINER POWER STATIONS	288
PUMPED STORAGE FOR ONTARIO	289
PROBLEMS AND PRACTICE IN ENGINEERING	291
ELECTRICITY IN MINING	292
POWER AND PICTURES	292
AMERICAN TECHNIQUES	293
SPEEDY FILLING OF FUEL TANKERS	294
OVERSEAS NEWS	296
PERSONALITIES IN THE INDUSTRY	298
BRITISH STANDARDS	301
DUST-FREE WIRING	301
RESEARCH FOR PROFIT	302
THE BUYER'S COLUMN	303
A VERSATILE CIRCUIT-BREAKER	305
NEW LITERATURE	306
THE WEEK IN NEWS	307
Company Activities	312
Electric Supply News	313
COMMERCIAL INFORMATION	314
CLASSIFIED ADVERTISEMENTS	51
INDEX TO ADVERTISERS	58

ESTABLISHED 1891

SUBSCRIPTION RATES—United Kingdom and Overseas £2 10s. 0d. per annum. Canada C$7·50c., U.S.A. $7·50c. per annum. Subscriptions are payable in advance and may commence with any issue throughout the year. Overseas subscriptions may be paid to The Electrical Times Limited by banker's draft, cheque or international money order. Single copies are obtainable, price 9d. each.

SARDINIA HOUSE, SARDINIA ST., LONDON W.C.2

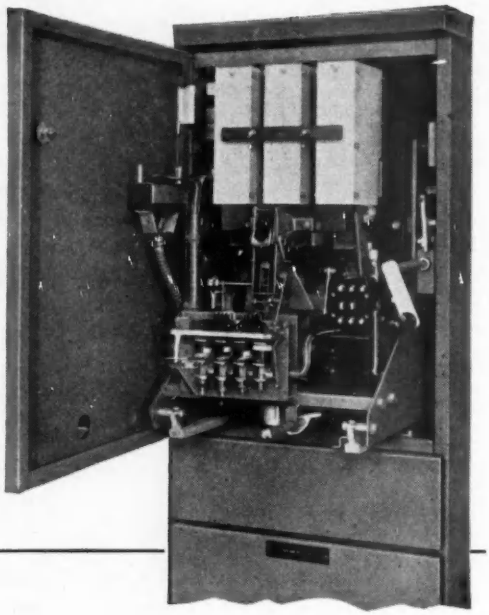
Telephone: HOLborn 6016 Telegrams: EQUIVOLT, ESTRAND

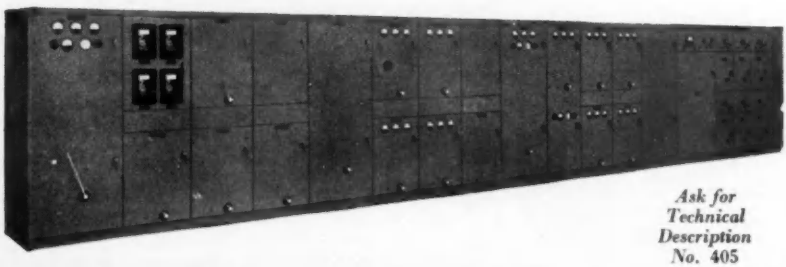
G.E.C.

AIR-BREAK SWITCHGEAR

15 MVA to 30 MVA
400 V to 660 V

- Single tier for breakers up to 3000A
- Double tier for breakers up to 800A or for Isolators of all ratings
- Four tier for fused-switches up to 400A or for contactors
- Fully interlocked
- Totally enclosed. Access by rear doors to busbars, C.T.s and cable connections
- Totally enclosed feature retained with breakers isolated. "SERVICE", and "ISOLATION" positions seen at a glance





Ask for Technical Description No. 405

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Editorial

FREEDOM FOR COPPER

COPPER has been at the heart of electrical engineering since its very beginning, and is likely to remain so for many a day. In consequence, the freeing of dealings in the metal on the London Metal Exchange after many years of Government control was of vital importance to the industry; in the event, the impact of resumed dealing was markedly greater than expected, because of the sharp fall in price of the metal when dealing began on Wednesday. Consumers' stocks had been run down in anticipation of some fall in price, but there was no early rush to buy and it was perhaps significant that although most of the early dealing was in terms of three months' deliveries, a substantial discount was maintained. No doubt the apparent improvement in international relations has had its effect in bringing about this situation, though the normal low seasonal demand means that potential buyers have had no urgency in their enquiries to offset such external influences. It will inevitably be some time before the lower prices are reflected in the costs of electrical machinery and apparatus, but with the present low level some marginal reduction may be expected eventually. This will apply particularly to machines and cables, and may give a welcome improvement in our position in the export field.

SCOTTISH UNION

QUESTIONS asked in the last weeks before Parliament adjourned for the summer recess indicated M.P.s' continued interest in the reorganisation of the Scottish sections of the B.E.A. The guarded answers they received did little more than confirm that preparation of the legislation briefly foreshadowed in the speech from the throne last November was well advanced. For more definite news, enquirers had to await a Scottish Office Press Conference, at which the Secretary of State indicated that a new Scottish Electricity Bill is indeed in prospect for next session, provided Parliamentary time can be found for it. The restrained public debate which has progressed spasmodically since the Bill was officially envisaged has elicited one further fact: the autonomy of the North of Scotland H.E. Board will be preserved in recognition of that body's concern with people as well as power. Just what form the resulting Lowlands Authority will take remains uncertain; its direct responsibility to the Secretary of State will, however, not relieve it of the need for close technical collaboration with the B.E.A. Perhaps the main result to be expected is an intensification of that independence in administrative thinking which already seems to increase with distance from London.

PREPAID EXTENSIONS

WHATEVER farmers may say, there is no doubt that the average supply engineer who becomes involved in rural electrification is an enthusiast. He is usually fighting against a difficult financial situation, and his ingenuity has to be bent to overcoming that. Line rental, capital contribution and guaranteed revenue are schemes that have been tried with success in this country; now from Australia comes news of a more extreme arrangement. In Victoria it is money that is short, rather than capital equipment. Many activities of the State Electricity Commission have had to be slowed down, or even halted, for lack of funds. Rural electrification development would have had to languish completely, but enthusiasm on the part of the electricity authority found a solution. This was to invite consumers requiring a supply to lend the Commission the whole cost of the necessary extensions; on the money lent the Commission pays interest. As well as this, the Commission offsets electricity

accounts against the amount of the loan. This is certainly a step further than anything so far attempted in this country. The scheme is, of course, only a temporary expedient, but it does mean that rural progress is not stultified in Victoria as it might have been.

LOOKING THE PART

CATHEDRALS of power, we have heard post-war power stations called; and like many engineers, we have resented that "cathedral" epithet, feeling that it represented too many pounds spent on pandering to alleged public aesthetic taste. It comes as a pleasant surprise to find that the Royal Fine Arts Commission is now objecting to this tendency to "monumentalise" the power station. Their complaint, reasonably enough, is based on current architectural theory, as usually expressed in the demand that buildings should be functional. How far they will permit this creed to be applied is uncertain: it seems likely that there would still be an explosive objection if the use of corrugated iron were proposed, although this may be functionally satisfactory. Nevertheless, this latest statement of the Commission is unquestionably a step in the right direction of bringing artistic requirements closer to engineering needs. It may not be entirely without significance that it is made in a year when the Commission has had before it the design of the B.E.A.'s first semi-outdoor station, that to be built at Ince. Buildings of this type can make few concessions to the demands of aesthetics; but they offer a much-needed opportunity for economy.

RESEARCH AND SELLING

RESEARCH and sales departments have in all too many firms an apparent antipathy, entrenched in a lack of understanding of each other's problems and techniques. Yet since increased sales are the ultimate aim of commercial expenditure on research, close and willing co-operation is the desirable relationship. How to obtain this was a point threshed out to good effect at a recent F.B.I. Conference attended by top level executives representing both sides. On many of the problems agreement in principle was readily reached—though we suspect that execution of the ideas will be less readily obtained. But one notable question remained quite undecided: to what extent should the research technologist be allowed to meet the customer? No doubt such meetings can, in favourable circumstances, greatly accelerate the direction of scientific investigation and discovery towards higher quality and lower costs. Yet many doubt if the research man can really get his story over, without ingenuously giving too much away on the one hand, or infuriating the customer by obscurity and a knowing condescension on the other. Probably the criterion is in the nature of the product. For a well-established line the salesman is an efficient expert, and the researcher is better confined to the laboratory. Where, however, a new idea is being offered, the research worker with his knowledge of its fundamental limitations and possibilities may, by direct contact with the customer, demonstrate and clinch new and profitable potentialities.

CLEANER HORSES

MODERNISATION of mining invariably means more machinery, and usually more electricity. It is no surprise, then, to find in the latest annual report of the Chief Inspector of Mines, notes on some new uses of electricity underground. That pit ponies should be involved, however, is distinctly unexpected. Yet there were over 15,000 horses employed in mines at the middle of 1951, and their care involves many men. This is where electricity comes in: vacuum cleaners are particularly well suited to the grooming of horses whose coats are heavily contaminated with coal dust. The object of introducing vacuum cleaners was to help the groom, but it appears that the horse has gained as well from the juxtaposition of old and new energy sources in coal mining.

Meteor

COST COMPARISONS OF INDUSTRIAL LIGHTING

A graphical method of comparing different types of factory illumination

by J. JOHNSON

WITH the increasing popularity of discharge lighting, the problem of comparing the relative merits and costs with those of tungsten is becoming a regular one, and can be most laborious and then difficult to convey to those financing the installation. This problem is applicable to new installations in modern factories, but it is becoming more frequently applicable to established factories where it has been decided to have complete renewal of the lighting installation as the demand for more lumens has been appreciated.

General Considerations

Some factory processes will require essential colour-rendering properties for general lighting, and this will eliminate the sodium- and mercury-discharge types from this comparison. They could be included, however, if colour-rendering is needed locally only. It will be appreciated that for the purpose of this comparison several assumptions have been made, but those that are not common to all types of lighting can easily be adjusted to meet individual requirements. For instance, for the basic calculations it has been assumed that an area of 1,800 sq ft has to be illuminated to give an average intensity of 10 lumens/sq ft on a working plane of 3 ft; the mounting height of the lighting fittings is 20 ft; the coefficient of utilisation is 0·5, and the depreciation factor is 1·43. Using this information, the total lumens required will be 514,800.

The initial cost of a lighting installation is made up from—(*a*) the cost of the lighting fittings complete with lamps—these prices have been taken from the current lists of reputed manufacturers—and (*b*) the cost of the installation, which has been taken to be £4/kW plus £3/point. Agreement on this is quite irrelevant, as will be seen later the installation costs are very rapidly absorbed.

The number of years over which the capital can be distributed has been limited to eight, because some interesting limits occur about then, and there is no doubt that by that time

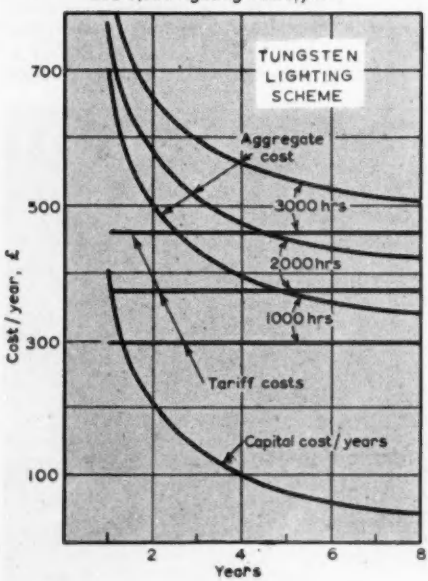
Here is seen a typical factory installation using sodium-vapour lighting (Philips Electrical Light Group)

the cost of discharge fittings and lamps will have reduced considerably. For a general consideration, the number of hours for which the lighting will be in use each year is a problem, but it has been assumed that for a factory with eight-hour shift and five-day week a figure of 2,000 lighting hours would be reasonable. Then for a modern factory designed for maximum natural lighting, 1,000 lighting hours per year has been assumed. For the severest conditions, a factory with poor natural lighting or on a 24-hour shift would justify a figure of 3,000 lighting hours per year. The number of lighting hours is most important, and in special cases it would pay the works engineer to make his own graphs.

Replacement Times

Lamp replacement time has been taken from the makers' lists, and for tungsten is 1,000 hours, mercury 2,500 hours, and sodium 3,000 hours. Incidentally, the graphs prove the false economy of working lamps "to the death." The number of lighting points follows readily from the total lumens required and the average lumens output of each lamp. For convenience it has been assumed that there will be 100% kW maximum demand, and that there will be a two-part tariff applicable, with a charge of £1 17s. 6d. for each kW of maximum demand/quarter. The running charge has been assumed to be 0·45d/unit. Both the m.d. and running charges would obviously vary in particular cases, and here again the works engineer would be interested.

Fig. 1. These curves show the variation of cost for a tungsten lighting scheme with 1,000, 2,000 and 3,000 lighting hours/year



General Formula

The aggregate annual cost is given by

$$\frac{C}{Y}+\left(\frac{H}{Lh}\times Lc\times N\right)+(kW\times £7{\cdot}5)+(kW\times H\times 0{\cdot}45d.)$$

Where C = Initial total cost of lighting fittings and installation.
Y = Number of years over which C is to be distributed.
H = Number of lighting hours/year.
Lh = Lamp replacement hours.
Lc = Lamp cost each.
N = Number of lamps.

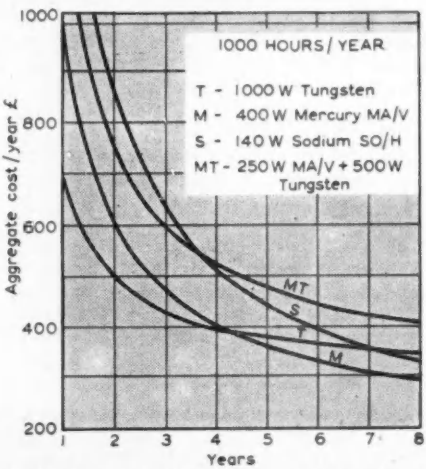


Fig. 2. Curves showing variation of aggregate cost of lighting schemes for 1,000 lighting hours/year

Tungsten Lighting Scheme

Using 1,000 W clear tungsten lamps with a minimum average lumens throughout life of 17,800 requires 29 lamps to give the 10 L/ft² which are needed. The total load will be 29 kW.

	£	s.	d.	£	s.	d.
Cost of 1,000 W lamp		17	6			
Dispersive reflector	6	0	0			
Total cost of fitting	6	17	6			
Cost of lighting fittings = 29 × £6 17s. 6d. ..				199	7	6
Cost of installation = 29 × £7 ..				203	0	0
Hence C = ...				402	7	6

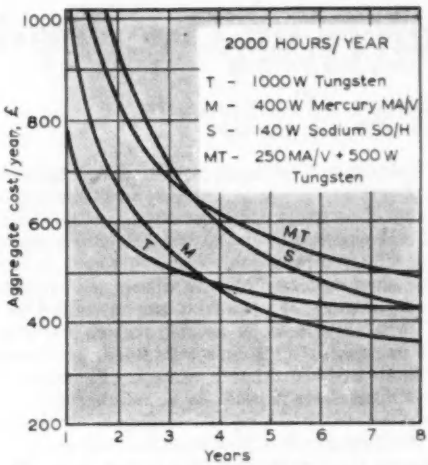


Fig. 3. This graph shows for lighting schemes of 2,000 lighting hours/year, variation in aggregate cost

For the 1,000 lighting-hour scheme:

	£	s.	d.
$\left(\frac{H}{Lh}\times Lc\times N\right)=$			
$\frac{1,000}{1,000}\times$ 17s. 6d. $\times$ 29	25	7	6
(kW $\times$ £7 10s.) = 29 $\times$ £7 10s. ..	217	10	0
(kW $\times$ H $\times$ 0·45d.) =			
29 $\times$ 1,000 $\times$ 0·45d. ..	54	7	6
	297	5	0

In Fig. 1 a curve is shown for the initial capital cost C spread over one to eight years. Also shown as a constant is the annual lamp replacement and tariff cost of £297 5s. for the 1,000 lighting-hour scheme. Adding these two costs gives a curve which indicates the aggregate cost as it would be distributed over one to eight years. The curves for 2,000 and 3,000 lighting hours are obtained in the same manner.

Fig. 1 and the calculation above merely serve to indicate how the curves for the other types of lighting have been developed.

Comparisons and Conclusions

Two incidental and general conclusions are apparent from Fig. 1; the first being the rapid absorption of the initial capital costs, and the second is the necessity of regular lamp replacement. For the 1,000 lighting-hour scheme after four years, lamp replacement cost constitutes only £25 in an aggregate cost of £397.

Curves are shown in Figs. 2, 3 and 4 for a lighting scheme using 1,000 W tungsten, 400 W mercury, 140 W sodium, and a composite unit of 250 W mercury with 500 W tungsten for 1,000, 2,000 and 3,000 lighting hours/year.

In all cases it is apparent that for a short-term policy up to four years the tungsten scheme leads the economic field, but after this it is a rapid loser to the mercury scheme. For the 1,000-hour curves the sodium scheme overtakes tungsten after seven years, and it would be found that it becomes more economical than the mercury after 15 years. For all practical purposes it can be assumed that the composite scheme never becomes as economical as the tungsten, although for a short term and where colour-rendering is important it is a better proposition than the sodium.

For the 3,000-hour curves the mercury scheme makes a dramatic swoop, and after only three and a half years rapidly and easily becomes the most economical scheme.

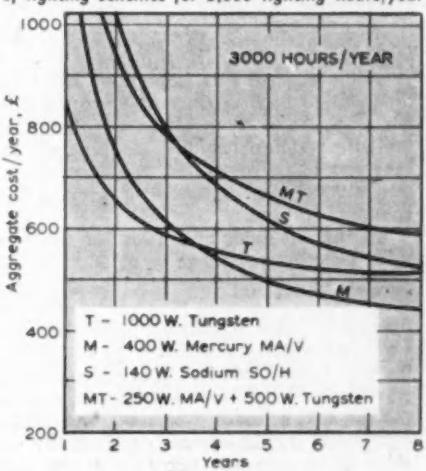
Two interesting general conclusions are seen from Figs. 1, 2 and 3:

(*a*) For a smaller number of lighting hours it takes longer for the mercury scheme to become cheaper than the tungsten scheme.

(*b*) It would appear from the curves that the smaller the number of lighting hours the more economical the sodium scheme becomes as compared with the tungsten scheme.

The reason for this is that the lamp replacement cost together with the running cost—which are both proportional to the lighting hours—are less for the mercury as compared with the tungsten, whilst for the sodium they are more.

Fig. 4. Shown here is the variation of aggregate cost of lighting schemes for 3,000 lighting hours/year



Cooling Transformers on Overload

Establishment of Cutting-in Temperature

IT is frequently economically desirable to introduce on transformers liable to overloads some form of auxiliary cooling in addition to the normal cooling system. This additional equipment is automatically brought in when overload conditions occur, and cuts out when normal operation is restored.

One example of this technique using water cooling was undertaken by the Union Electric Co. in Missouri,[1] where in 1947, due to overloading of the St. Louis network it was decided to introduce water sprays in the existing transformer vaults to increase their capacity. For the sake of operating convenience however, the sprays were turned on and left on during the whole of the summer season, as the ambient temperature frequently rises to over 38° C. This is not therefore strictly parallel to the temporary overload case, but possesses considerable interest as it was found that normally rated 300 kVA transformers could be made to carry 500 kVA under water cooled conditions within the limits of normal temperature rise. At the same time, on a 118% load test, with a transformer carrying 592 kVA, the losses averaged 8·5 kW, and by measuring the quantity of water used and its temperature rise, it was estimated that the heat removed by the water averaged 5·6 kW, some 65% of the losses.

Increased Ratings

When the question of transformer cooling with auxiliary fans is considered,[2] it is generally regarded as important that these fans should be brought into operation only when load and temperature conditions require the additional cooling, and generally the fans should be controlled by a temperature device which will simulate the winding hot-spot temperature.

An analysis made of fan-starting temperatures covering the range from 60 to 95° C winding hot-spot temperatures in power transformers indicated that for satisfactory operation three conditions were desirable. First, the winding hot-spot temperature during a transient period of load-change should stay within the allowable temperature limits, second, that at loads over 100% the cooling equipment should operate continuously and third that unnecessary operation at low loads should be eliminated. These three requirements can generally be met by the selection of a suitable cutting-in temperature but care should be taken to avoid over-rapid cycling. This latter phenomenon is dependent mainly on the on-off temperature differential of the relay switch. The differential should be selected to give a cycling time that is in the order of a minimum of one hour and a maximum of approximately 4 to 5 hours. It should be noted that for any given relay setting, there is an associated loading which may cause fan cycling.

Starting Temperatures

The starting temperatures are naturally dependent on the maximum allowable temperature specified, but the starting of cooling equipment should also be affected by the local changes, and their immediate effects on the temperature of the transformer windings. With late starting of fans (90° C hotspot temperature), a continuous load, above self-cooled but below fan-cooled, rating may cause the fans to cycle every few hours, which is undesirable. Dropping the temperature down to say 70° C for starting, may on the other hand lead to the transformer having forced cooling at loadings well below self-cooling load. This is due to the slow cooling of the hot spot and the fact that a fair temperature differential is required in the relay system. Two limits are therefore set for transformers to ASA standards. For an OA/FA transformer, 85° C winding hot-spot temperature is a satisfactory starting point and for an OA/FA/FA transformer, 80 and 85° C are suitable for the starting points for the first and second group of fans. It should be remembered that these conclusions apply only to the use of fans as auxiliary cooling equipment on power transformers.

The above analysis while of interest is only applicable to power transformers built to American specifications. The general question of the economics of forced peak-load cooling is most complex and work is being carried out both in this country and in America, to rationalise the factors involved.

---

[1] Electrical World, Nov. 19, 1949, 109.

[2] H. A. Fohrhaltz, Power Apparatus and Systems, Electrical Engineering, June, 1953.

Our readers' views . . .

Naming the Goods

WHATEVER the reasons for the adoption of trade names by manufacturers to describe their products, the maintenance man feels no concern for these when he is faced with obtaining a replacement part for a piece of apparatus which bears a trade name he has never met before.

Your feature "Your Queries Answered" confirms that much time is lost and trouble caused by products bearing only a trade name, and it has been my experience that well-known manufacturers allow their products to leave their works without any label whatever, not even a trade name being given.

To the writer it seems unreasonable to omit the makers' name from a well-made product, and certainly in many cases, apart from the trouble this practice gives to the user and repairer, the manufacturer loses a great advertising opportunity. Complications arise, I need hardly mention, when the maker is supplying to a selling firm who wish that their name only should appear on the product, but apparently here again no consideration is given to the fact that a replacement is usually required without the delay which is necessarily entailed by the order going through two or three hands before it reaches the makers. Apart from the paper work involved there is also the travelling with its probability of damage to delicate equipment.

Many British Standard Specifications, when dealing with the markings to be attached to a piece of electrical equipment, clearly state that the makers' name must be given. Many firms of repute, however, ignore this clause (while still claiming that the product complies with the particular specification) by having their own name affixed even when another firm has made the equipment for them. This practice is prevalent throughout the industry. The labels on second-hand plant, of course, come into a category of their own!

It is to be hoped that some day electrical equipment will bear a true label from which the maintenance engineer will be able to order spares and replacements, without expectation of delay in his order reaching the actual makers.

"R.A."

BOLTON

Registration

IMMEDIATELY after reading Megohm's whole page rejoinder to my letter of June 18 I picked up this week's *Surrey Advertiser* and found that the Editorial under the heading of "Cut the road toll" commenced with this sentence: "Despite road safety campaigns there has been a grievous increase in the number of casualties." This statement has been made in various ways in the daily press and I claim there is more than sufficient evidence that licensing has not reduced motor accidents. Licensing for electricians does not obtain in this country, but from notices in countries where such is the case there is still a spate of the typical accidents which supports my statement that licensing *does not appear* to reduce electrical installation faults.

As to Megohm's suggestion that I have implied questionable trading tactics in the supply of electrical appliances this is the reverse of the truth. If a chemist supplies anything of a poisonous nature he has to so label it as a warning to the purchaser; why should not a purchaser of electrical appliances be warned of the danger of meddling?

In the case of electric fires it has been necessary for the Government to pass legislation recently compelling all makers to provide an efficient fireguard. What would Megohm have said if I proposed this 12 months ago? Perhaps my indictment would have covered two pages of your valuable space. It will, however, be some consolation to Megohm when I say that I agree with his observations in the second column of his contribution except his reference to licensing of electrical contractors and electricians. It might interest him to know that when I was Chairman of the I.E.E. Wiring Regulations Committee I made a strong endeavour to secure the Committee's approval to the establishment of a proving or clearing house. I was unsuccessful because I was told by the then Secretary that it was outside the terms of reference of the Committee, and I learned from other sources that opposition in certain quarters would be sufficient to ensure rejection by the Council. I hope that the present joint modest efforts of E.D.A. and B.S.I. may develop as suggested by Megohm.

F. W. Purse

WEST HORSLEY, SURREY.

Free Dealings in Copper

A SURVEY OF THE PAST AND SOME IDEAS ON FUTURE TRENDS

"COPPER, Gentlemen, Copper," was heard on the London Metal Exchange on Wednesday of last week for the first time since the outbreak of the 1939-45 war. As the electrical industry is the largest consumer of copper, the trend in copper prices is a matter of concern among electrical engineers, particularly as this country is the only large consuming nation which does not also produce. It is somewhat fortunate for our economy that nearly 80% of our copper comes from Northern Rhodesia, which, incidentally, is the world's third largest producer.

Rhodesian Copper Belt

Of particular concern to the U.K. therefore is the future of the N. Rhodesian Copper Belt and the prospects it offers. Record output was achieved there in 1951, but production declined last year to 327,000 tons following handicaps of a three-weeks strike and fuel shortages. Labour relations apart, it is not wishful thinking to suppose that during the next decade an annual production rate of over 400,000 tons a year will be attained. Reason for this confidence is the bringing into operation of four new mines and the expansion of existing ones. In addition prospecting is going ahead in the areas surrounding the existing Belt. Further, the shortage of fuel will be ameliorated when the industry commences to take power from the adjoining hydro-electric resources of the Belgian Congo.

Unfortunately, labour problems among African workers are by no means settled. The recent discontent was not merely a matter of wage claims, and indications are that another wave of unrest is likely to break out. It may be recalled, however, that last December a £2 million scheme was announced to improve housing and other amenities among native employees. This will undoubtedly tend to allay such unrest. On balance therefore there seems every reason to believe that supplies from N. Rhodesia will be assured at an annual rate well above the existing one.

So much for N. Rhodesia, but what of world production and consumption? In the year following the war, mine output fell considerably, but thereafter it has regularly exceeded the two million tons per annum mark. In 1950 it was over 2¼ million tons and last year's rate was 2,375,000 tons a year. A similar pattern was shown by production by copper smelters, but due to the inclusion of secondary metal production figures are substantially higher. By the end of 1948 stocks of copper had been seriously depleted, and in the following year the post-war demand had spent itself and consumption declined markedly. The higher smelter output thus provided a surplus for the first time since 1945. The Korean war followed, as did world rearmament and American stockpiling, which led to the allocations, prohibitions and price increases, which are now eased.

The average price of copper per ton in Britain in the years following the war is particularly remarkable because prices soared at the precise time that production began to exceed demand. In 1946 the average U.K. price was £77 a ton, rising to £134 in 1948. It dropped slightly in 1949, but in the succeeding years rose to £179, £220, and finally to £259 a ton.

When dealings opened on the London Metal Exchange last week, business was brisk at the outset and cash metal fell to £215 per ton—a decline of £37 on the Government's final selling price. By the weekend the figure had become steadier at £222, which is probably a better indication for the immediate future.

The Future

Whilst the availability of adequate supplies of copper to satisfy world demand in the future seems assured, there are so many factors to be considered when trying to analyse price trends that accurate prejudgment is almost impossible. Much will depend on America and her stockpiling programme, and the immediate political situation with its consequent defence contracts will also greatly affect prices.

On the credit side must be placed the substitution of other metals for copper, a trend which has made substantial progress in the last few years. The immediate dominant factor, however, is the copper reserves that have been accumulated in Chile, equivalent to about two months' production. Any liquidation of this stock would have a decisive effect on immediate price trends.

13 AUGUST, 1953

Redecorating in a fine Period Style

LANCASTER HOUSE TAKES ON A NEW LEASE OF LIFE

The plinth fittings used in this staircase hall were originally designed for use with oil lamps

REDECORATION of Lancaster House, damaged by bombing during the war, has transformed this building into one of the most magnificent period houses in London, and has given the Ministry of Works opportunity to renew the electrical installation and to provide other services not previously incorporated. Prior consideration, before the work was commenced, had to be given to preserving the fine art work on walls and ceilings whilst, in view of the spaciousness of many rooms, suitable provision for maintenance of fittings could not be ignored.

Conduit

When originally wired, conduit had been used throughout the house, and it was fortunate that nearly all of this was in good condition. Most of the re-wiring for the ground and first floors, where are situated all state apartments, was therefore accomplished by merely withdrawing the old wiring, replacing it with new v.r.i. cable. In some cases, the number of lamps on fittings has been increased, but nowhere was the existing conduit found inadequate.

Switchgear and distribution equipment, was however, completely renewed, together with the wiring and conduit in the basement and on the second floor. In the former, conduit has been run on the surface. For the second floor, used as offices, a concealed installation has been employed. Here, large spaces between walls, running the entire height of the building, not only enable sub-main distribution cables and other runs to be transferred easily from floor to floor, but allow distribution boards and isolators to be partially sunk into the wall.

Turning to the installation in greater detail, the primary distribution centre for the building is in the main switchroom in the basement. Here take place the first two stages, as it were, in the breakdown of the supply into final sub-circuits. From the main circuit-breaker are fed some half dozen or so 100 amp t.p.n. wall mounted switch-fuses, each of which supplies a section of the building. This is further split up by a ten-way 100 amp distribution fuse board, from which several three-phase supplies, as required, are run in conduit to the sub-main board.

Floor Distribution

In the case of the first floor, each group of lighting or socket-outlet circuits, supplied from one of the ways on the basement disboard, is further controlled by a 100 amp isolator. From this is fed the final distribution fuse/switch board supplying final sub-circuits. All fusing for the latter is 15 amp. Switches on the distribution boards rather than in individual apartments, ensures that only the authorised engineer can alter the lighting.

Apart from provision of supplies to light-

These special fittings over the grand staircase have reflector flood lamps for throwing light inwards and upwards to illuminate the heavily decorated ceiling

ing fittings and socket outlets, several other requirements had to be met on the first floor. From the room in which the sub-main board is situated, which serves also as a small kitchen having two electric cookers, a newly-installed service lift runs up from the basement and ground floor. On the switchboard is the lift motor isolator, and the other supplies. A single 100 amp switchfuse has also been provided for use as a supply for radio or television equipment should this be necessary.

Indicator System

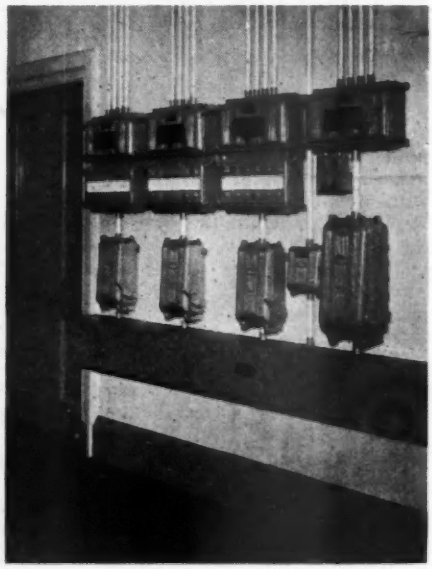
Other electric services include a push-button bell indicator system for ground and first floors. A twenty-five core cable runs, as a "ring main" round the building between these floors, tapped at intervals to connect push buttons in apartments. It serves two indicator boards, one on the first floor switch room, the other at the entrance room. Provision has also been made for amplifying facilities, together with translation equipment for use during international conferences.

Other new signalling and communication facilities provided are a fire alarm system and an internal telephone exchange. The latter has been formed on the second floor.

Of the fittings themselves, all were required to be cleaned and re-gilded, and several new fittings have been obtained from various sources. Some have been modified to give them a double use. An example of this is to be seen in the main staircase hall where the provision of suitable illumination of the lantern light was one of the major problems.

Between 20 and 30 ft above the first floor landing runs a decorated ledge round this hall, behind which lamps had been originally concealed, to provide upward lighting for ceiling and lantern light. Access to these lamps was extremely limited, being through trapdoors from adjacent rooms and corridors

Below is shown the method used to overcome the difficulty caused by a table plinth covering a socket-outlet. On the right is a view of the switch and fuse gear sub-main distribution board



on the second floor. This had resulted in attention being given only to those lamps nearest each trapdoor, as access from the hall was almost impossible due to the heights involved.

Upward Lighting

The difficulty was overcome by adapting lighting fittings suspended over the first floor balustrade at each end of the hall. In each was fixed an internally silvered 100 watt reflector lamp to throw light upwards. In the lantern light itself sudsidiary lighting behind a pillar edging at its base, provides a striking silhouette effect.

A general view of the Grand Gallery. Corner standards are supplied from a socket-outlet adjacent to the base

A similar problem presented itself when considering lighting for the Main Gallery lantern light. Here the difficulty has been overcome by installing reflector flood lamps outside the lantern light throwing light inwards and upwards. The lighting in this room is provided by chandeliers at each end and four heavy ornamental standard type fittings, fitted with "candle" lamps. They stand in corners along the side of the room caused by widening of about 15 ft of the centre section. Supply to the lamps is taken in flexible cords from adjacent socket outlets in the dado.

In the music room is seen one of the new chandeliers designed by Philip Shaw.

This striking chandelier in the music room was made to the design of Mrs. Anthony Eden

Striking in appearance, the outline approximates to a conical upper half surmounting a bowl, both fabricated in cylindrical pieces of glass. Main internal illumination is provided by lamps mounted spirally on a centre stem. A "ghostly" effect however is produced by illumination from three low power lamps in the base of the bowl, supplemented by a ring of lamps mounted in a gilded ornamental ring encircling the chandelier at the join of cone and bowl. These serve to illuminate both the upper half of the chandelier and the ceiling. In this same room, in which Chopin is reputed to have given his first recital to Queen Victoria, excellent indirect lighting is obtained from sources mounted behind a frieze about 10 ft from the floor.

Another fitting worthy of mention is again a chandelier, but one originally installed when Lancaster House was built. On a gilded ring supported by the centre stem are radially mounted opal glass envelopes fashioned after hunting horns, in which lamps are situated. This is one of a pair but bombing resulted in the destruction of some of the glass horns. As it is, apparently, now impossible to make exact copies, the number remaining intact were sufficient only for one fitting.

General contractors for the redecoration and restoration were Ashby and Horner Ltd. Troughton and Young Ltd. were responsible for the electrical installation in the north-west wing, Philip Shaw Ltd. for the lighting fittings, and Evans Lifts Ltd. for the lifts.

From AN ENGINEER'S NOTEBOOK

I HAVE previously remarked on the ever extending use of radio-active materials and there seems little doubt that the last half of the twentieth century will come to be regarded as the nucleonic age. That is if our American friends do not succeed in developing a snappier name for this new growing subject. Hardly a week now goes by without hearing of some new development or application in this field and a recent one that attracted my attention was the production of a new stable light source. There is of course nothing new in the combination of a radio-active source with a fluorescent material; it is at least as old as luminous clock dials but the stringent factory regulations, safeguarding the use of such materials, show how much room there is for improvement. Today a far wider choice of radio-active materials is available and by combining one of them, tritium, with a fluorescent material and processing the two together to obtain a unified crystalline form, a light source of much greater stability has been obtained. The soft β-ray emission from the tritium with its longer half life provides a fluorescent brightness which is said to diminish by no more than 5% per annum. While the introduction of this material seems unlikely, to me, to lead to any substantial increase in applications of self-luminosity, it may none the less provide a more satisfactory source for existing uses. One other application is suggested. As the spectral emission approximates to the response of some types of photo-electric cells, and in view of its adequate stability, the new material is ideally suited as a light source for testing such cells.

* * *

IN my student days when the structure of the atom was a relatively simple matter of electrons and protons, we electricals were enthusiastic for the all-embracing character of the electrical structure of matter. A friend, however, whose nickname betrayed his association with the chemical department, was never tired of arguing that it was protein that really mattered, for without it we students would not have been of this world. Now I see that some tests have been conducted, the results of which, after the bland acceptance of our minds of those days, would have truly floored our chemical friend. The tests arose out of the cosmological hypothesis that the earth's atmosphere was originally compounded of methane, ammonia, hydrogen and water vapour and by the action of lightning those gases were split and reformed so as to produce protein. Recently laboratory tests have been made with a view to testing the possibility of such synthesis and by subjecting the gases in an airtight container to electric discharges it was found that, within a week, amino acids were produced which could be clearly identified. I am not so sure now that this takes us very far along the road to an understanding of the origin of life. It may be another of those many steps we have so far made but the essential factor, the genesis of life, is still missing.

* * *

AN electrical concept that has become fashionable in scientific circles is that of the existence of "positive holes"; a reciprocal, as it were, of the presence of electrons. Although this concept is as old as the electron theory itself, it is only in the past few years that this expressive term has come into general use. Particularly has it found application in discussions of theories associated with semi-conductors where the complexities of crystal triode performance can be conveniently expounded with its aid, at least, so I am told. But we are likely to hear a deal more of positive holes in the future. Recently I came across such a reference in a discussion of the effects of X-ray radiation on polythene cable. Prolonged radiation appears to have the surprising result of markedly increasing the temperature coefficient of electrical conductivity of the insulant. In explanation it is suggested that the conductivity of unirradiated polythene is due to electrons at a shallow level with respect to the conduction band while after irradiation it is due to positive holes at a deeper level. Perhaps some readers will find such an explanation as unsatisfying as I do, all of which suggests that if we are to delve into the theory of semi-conductors we must become more familiar with the habits of these vacancies in the world of atomic theory.—*E.R.G.*

THE VOLTAGE OPERATED E.L.C.B.

Some Suggestions for the Revision of a Code of Practice

By T. C. GILBERT, M.I.E.E.

TWENTY-TWO Codes in the electrical series have now been published in their final form. They have been drawn up by a Committee convened by the Council of the I.E.E. on behalf of a Codes of Practice for Buildings Council set up under the aegis of the Ministry of Works, and published by the British Standards Institution. It is now understood that one of these Codes, CP 321 (1948), "Electrical Installations, General," is to undergo revision, and the present would seem a good time for opinions, suggestions and requests to be directed to the Committee responsible for the work. The writer would ask, with all due deference, for a complete reconsideration and redrafting of some of the clauses relating to earthing, particularly Clauses 512 and 513 of this Code.

The former of these speaks of "the resistance between the earth electrode and any other earthed position . . . excluding the resistance of the earth-leakage circuit-breaker if fitted," and the use of this term in connection with the, usually, highly inductive trip coil of the protective device seems inadequate; surely the word should be "impedance," as is now general practice in dealing with earthing circuits or earth continuity conductors? There are many other references to "resistance" in the whole section, and no doubt there will be some revision in this particular connection.

Leakage Voltage

Complaint is directed chiefly to Clause 513, firstly against its title—"Prevention of danger arising from current leakage." Surely danger may arise equally from leakage *voltage*, lying in wait for the unwary, although no actual leakage of current may be taking place. The sentence could be defended on the grounds that as soon as the victim touches the leakage voltage it is the leakage current through him that gives rise to danger, but on the other hand, the victim may never come into contact with the actual leakage current which is flowing, but only with the voltage set up on conductors or equipment by it. Would it not be simpler to title the section as "Prevention of danger arising from leakage," and leave it at that? It would seem to cover all possible contingencies.

Current Leakage

However, no doubt *current* leakage was uppermost in the minds of the draftsmen, as is indicated by the following paragraph—"(a) The only practicable means of ensuring that no danger arises from current leakage is to make the leakage current operate a protective device arranged to disconnect the affected circuit from its source of supply." This is arguable, but in view of later comments the point will be left for the moment. The writer, however, is one of those unfortunate engineers who has never been able to "make" a leakage current do anything it did not seem inclined to do. The paragraph goes on—"The following means are available:—

(i) *Over-current operated devices.* The resistance of the path of the leakage current from the point of leakage back to the neutral point of the supply system may be made low enough to cause the operation of the fuses or circuit-breaker provided to protect the circuits against over-current.

(ii) *Leakage current operated devices.* A separate device responsive to the value of the leakage current practicably obtainable may be connected in the path of the leakage current. (Operation of the device should be assured on or before the attainment by any of the associated non-current-carrying metalwork of a potential to earth of 40 volts.)

(iii) *Differential current devices.* A differential relay responsive to the difference of the values of the current in the 'go' and 'return' paths of the circuit, i.e., the leakage current, may be employed to disconnect the circuit automatically. A device operating on this principle has the advantage that it cannot be rendered inoperative, as might be the case with (a) (ii) of this Clause, in the event of the leakage current following a number of parallel paths. The device should be responsive to the value of the leakage current

practicably obtainable in regard to the resistance of the leakage path."

Apart from the admirable optimism evident in the above, with the exclusion of such inconvenient matters as fault impedance, etc., the first thing that strikes the practical installation engineer is that there is no mention—either here or elsewhere—of voltage-operated devices, now accepted and even recommended under Regulations for the Electrical Equipment of Buildings, which, presumably, take precedence in importance and authority over the Codes. Does this mean that such devices, in spite of their proved value, are no longer to receive such approval, or is it due, as the writer thinks, to preoccupation with *current* leakage and *current* operated protective devices, in the minds of the draftsmen? This latter view is supported by the statement made in (a) (iii) above, to the effect that the differential current operated device is not put out of action when leakage current follows several parallel paths. But this is an attribute also of the voltage-operated trip—in fact, it is its underlying principle; operation no longer depends upon the magnitude of the leakage current flowing, but only upon the voltage set up by it, whether in one path or a hundred parallel paths.

Differential Doubts

In fact, the writer is inclined to question the opinion that the differential current device cannot be rendered inoperative by alternative leakage paths under some conditions—a view that is rather reinforced by a later statement in Clause 513 of this Code. Here it is said—"The type described in (a) (iii) is unsuitable in relation to systems where the neutral is earthed at more than one point within the installation either deliberately or fortuitously." What is this but leakage current flow over a parallel path, or a number of parallel paths, for which immunity is claimed for the differential current device? The writer can see no fundamental difference—current leakage from a neutral is still current leakage—and in these days of unfused neutrals in the installation plus the increasing number of authorities now adopting multiple neutral earthing this aspect of current-operated protective devices clearly needs reconsideration.

In these days of non-metallic underground water networks, and overhead or under-eaves distribution systems, where no adequate earth electrode hitherto afforded by water mains or service cable sheaths exist, voltage-operated protective devices would seem to have some advantages over current-operated devices, and should receive at least equal consideration with the latter in a Code of Practice of this importance. The writer would not suggest any kind of preferential treatment for voltage-operated trips, although once the word "impedance" becomes universally substituted for "resistance" in earthing regulations their advantages will become more obvious, but only that voltage operated protective methods should at least receive mention; better to have hard things said about leakage trips than that they should be ignored completely!

Plainer Power Stations

POWER stations should avoid a monumentality traditionally reserved for buildings of religious or other civic purpose. This is the opinion strongly expressed in the eleventh report of the Royal Fine Art Commission, and it is one which many engineers will find easy to accept. The basic reason advanced for this perhaps surprising judgment on the part of the Commission is that "neither office buildings nor power stations can claim high significance on an emotional plane, and to 'monumentalise' them is to debase the currency of architectural values and to incur the risk of rendering the buildings themselves ridiculous."

But what is the new attitude of the Commission to the cladding of power stations? The only general indication given is that "a straightforward expression of the practical requirements is usually aesthetically the best." In this respect the Commission notes a continued improvement in the standard of design of power stations, which they trace to the more general employment of architects.

In all, the Commission considered the designs of seven B.E.A. stations during 1952 (Castle Donington, Ferrybridge B, Hams Hall C, Ince, Meaford B, Northampton and Wakefield). The list is of particular interest in that it includes Ince, the station near Ellesmere Port which is to have a boiler-house of semi-outdoor construction.

Another electrical matter to which the Commission have been giving attention is street lighting. In many instances the height of mounting of lanterns presents the most difficulty—the standard 25ft seems just to cause an all-important sky-line to be broken.

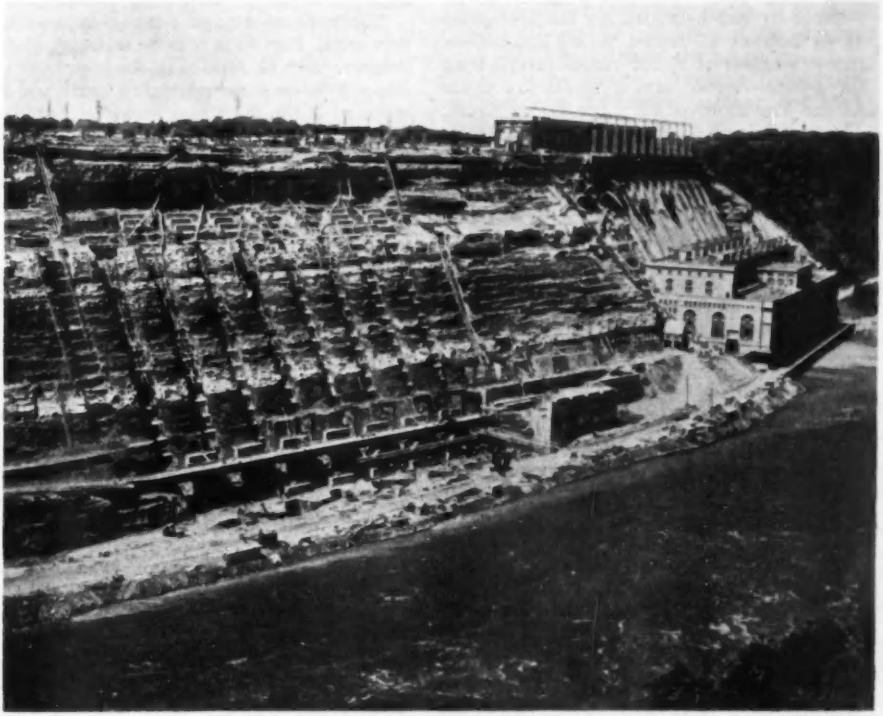
PUMPED STORAGE FOR ONTARIO

Scheme to Alleviate Future Power Shortage

THE growing power demand in Ontario has long been causing concern to the Hydro-Electric Power Commission of Ontario. Latest move in the battle to avoid serious shortages of peak capacity in the near future is a project involving the establishment of a large pumped-storage system to operate with the Sir Adam Beck No. 2 plant.

The necessity for this scheme has been shown by long-term load studies carried out by the Commission. These indicate a peak load power deficiency on the Southern Ontario System of 475 MW in October 1957 and 140 MW in December of that year. The forecast is based on a conservative yearly load growth of 6·4% and assumes that all generating plant authorised at the moment will be in service by that time. A further difficulty lies in the uncertainty of the date for final approval of the proposed St. Lawrence Seaway and Power project, and even if this were given in the immediate future there would be insufficient time to provide the plant to cope with the shortages in 1957.

The simple solution of increasing the power facilities at Sir Adam Beck No. 2 by the addition of extra units is also ruled out by the Niagara Diversion Treaty, which only permits a certain maximum flow to be drawn off from above the falls. The treaty is flexible and has as its objects the protection of the scenic beauty of the Falls and gorge, yet permits the maximum to be drawn off for power purposes. From April 1 to September 15 between 8 a.m. and 10 p.m. each day, a minimum flow of 100,000 cusecs must pass



This photograph shows the basic civil engineering work of the Sir Adam Beck No. 2 plant. The No. 1 plant is visible at the right-hand side

The main supply canal out of which pumped water will be drawn and into which it will be returned is shown in this picture taken during the constructional period

over the Falls. This period is, however, reduced by two hours during the September 16 to October 31 period. At all other times flows in excess of 50,000 cusecs can be used for power. Special arrangements are made for flushing ice out of the gorge during winter. The power is made available half to Canada and half to the United States; but Canada is permitted an additional 5,000 cusecs, which the Commission has diverted from the Hudson Bay drainage area.

The Scheme

It may be remembered that Sir Adam Beck Nos. 1 and 2 stations are to be located side by side. The existing station (No. 1) at present draws water from the Welland River, which originally flowed into the Niagara River some distance above the Falls. The No. 2 station, however, will draw its water from a point about a quarter-mile downstream from the Welland River junction with Niagara and the water is conveyed by two tunnels under the City of Niagara Falls. These tunnels will have a finished diameter, when lined, of 45 ft and for most of their length will be about 250 ft below ground level. They will, however, discharge into an open canal, which in turn conveys the water to a forebay at the top of the cliff above the generating stations. The existing canal which provides the water for the No. 1 station intersects the new excavation and the two will ultimately be connected to provide a common supply into the power-station forebay.

The pumped-storage scheme utilises this new canal. Part of it is to be widened, and a reservoir will be formed in the high land on one side of it. Four additional units will be installed at the Sir Adam Beck No. 2 station —bringing the ultimate capacity of the station up to 1,600,000 h.p. in 16 units. A secondary pumping/generating station will be erected on the edge of the reservoir and connected to the canal by an auxiliary waterway.

Capacity of the additional pumping/generating plant will be about 226,000 h.p. and the reservoir capacity will be sufficient to impound about 650 million gallons of water. Power for pumping will be supplied from the main system during off-peak hours, and the power generated in the pumping station returned to the system at peak loading. Further, the stored water then becomes available for use in the No. 2 power station.

Approval to spend an additional $43,842,000 on the project was given on July 22 by Premier Frost. This will bring the total amount for the Sir Adam Beck No. 2 station up to $343,742,000. Work on the reservoir is to be started as soon as possible, but it is not expected that the additional capacity at No. 2 will be needed until 1962. This assumes St. Lawrence power to be available in 1958.

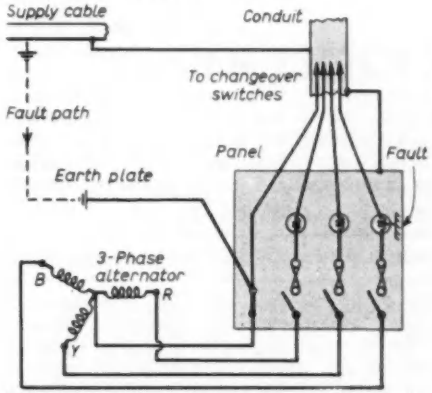
Additional work is also being carried out in conjunction with the U.S. to prevent erosion of the Niagara Falls themselves, the Canadian cost being borne by the Hydro.

PROBLEMS AND PRACTICE in Engineering

Earthing and Unbalance

THE fault under consideration occurred on a 30 kVA, 400 V, 50 c/s, diesel alternator set, which had been installed as a standby supply, and connected through 60 amp t.p. change-over switches to the load. When installed, the conduit, and all the metalwork had been efficiently bonded to the supply authority's cable. Before the installation was passed, it was necessary to earth the neutral in some way, this being remedied by an earth plate in the ground.

The set had been running satisfactorily for some considerable time, when a call was received that lamps were burning out whilst on load, although no fuses had blown. On carrying out tests with a voltmeter, the phase voltages were found to be as follows:—red phase 330 V, yellow phase 330 V (both approximate), and blue phase zero.



This diagram shows the connection of the standby plant and the position of the blue phase fault

On carrying out further tests with a "Megger" insulation tester, the blue phase was found to be down to "earth". After further investigation the fault was localised to the control panel, and subsequently to the blue phase ammeter. On dismantling the ammeter, the coil was found to be touching the metal case.

As can be seen from the accompanying sketch, the fault path was through the conduit, supply cable sheathing and ground to the neutral earth plate and thence to the star point of the alternator windings. It seems feasible that the resistance to earth of the earth plate was high enough to prevent the blue phase fuse from blowing (like the other two, it was 60 amp rewirable, in 17 s.w.g. copper wire and remained intact). Although the earth electrode had been tested and passed, the ground in this locality is very stony. From this it seems reasonable to suppose that the unbalance thus set up by the blue phase being down to "earth" would cause the voltages across the other two phases to rise to the measured values.—*D. A. Forsyth.*

Design for Maintenance

FOR the sake of the engineer who has to keep a plant running after the official opening ceremony I suggest that the following notes should be engraved on the hearts of all electrical system designers:—

(1). Oil circuit-breakers should be accessible for maintenance without the need to shut down a complete switchboard, by providing isolators in the right place.

(2). Similarly, sub-circuit fuses should be replaceable without switching off the supply to all the other fuses.

(3). Circuits should not be overloaded and should allow for future expansion.

(4). The size of cables should satisfy both voltage drop and maximum fault current requirements.

(5). Standby equipment should be provided for motors, feeder switches and cables, switchboards, transformers, in this order of importance, depending on available funds.

(6). Fuses or other circuit-breakers connected in series should be rated to provide discrimination of operating times.

(7). The value of protective devices should be determined by estimating the effect on the system of all possible faults.

(8). The operator should be able to tell what has happened, especially under fault conditions. Check the indicator system by estimating the effect of all possible faults and system operations.

(9). Adequate workshop facilities should be provided for electrical tradesmen.

All this may seem obvious to plant designers and manufacturers, yet how often you see cases where one or more of these points have been overlooked—until the plant engineer discovers them by painful experience.—*"Captain."*

Electricity in Mining

DURING 1951 there were 931 reportable accidents in mines in this country, 198 being fatal. These totals are below the 1948-1950 average, in spite of the inclusion of the Easington Colliery explosion, which caused the death of 83 persons. The figures are given in the report for the year of H.M. Chief Inspector of Mines, the first to appear over the signature of Mr. H. C. W. Roberts.

Electrical accidents accounted for three fatalities and 71 cases of injury, while in addition nine lives were lost due to an explosion of firedamp brought about by open sparking at the contacts of the master control box of a loader (see Electrical Times, April 24, 1952). Of the 71 persons involved in non-fatal accidents, 33 were electricians. There has been marked concern in mining engineering quarters about the relatively large number of electricians involved in reportable accidents, and the Chief Inspector notes that the matter is discussed at greater length in the report of H.M. Principal Electrical Inspector.

In all three fatalities, protective gear had been put out of operation, or was out of order. In one case an apprentice electrician had grasped a live conductor while fault tracing, a mechanical interlock having been put out of order; in another leakage protective gear on a switch was defective and inoperative; and in the third case remote control and overload protective features in a gate end box were likewise defective.

One incident to which the Chief Inspector calls attention relates to the finding in a safety lamp mine of a badly damaged wire-armoured cable with evidence of severe fusion of the copper conductors and the wires of the wire armouring. The armouring etc. was associated with the use of an ultra-sensitive earth leakage protective device and a form of electrical lock-out, and it is considered that the incident draws attention to the limitations of this form of protection.

Amongst other matters of electrical interest discussed is a blend of old and new—the grooming of horses below ground with the aid of vacuum cleaners.

POWER AND PICTURES

AS in previous years, the Hulton Readership Survey, although mainly concerned with the analysis of types of readers of national papers, has some interesting statistics for electrical engineers. The survey is based on a random sample of some 13,000 interviews during the first quarter of 1953.

Table 1 shows the spread by "social classes" of households having supplies of gas and electricity. There has been virtually no change since 1952 in the proportion of households having gas, but the number with electricity has increased, while the number of houses having neither gas nor electricity has declined. As in previous years, the desire for electricity wherever it is possible to obtain a supply stands out strongly in the tables.

TABLE 1.—AVAILABILITY OF GAS AND ELECTRICITY IN BRITISH HOUSEHOLDS

Class	AB	C	DE	All
	%	%	%	%
With gas and electricity	78	79	66	70
With electricity only ...	20	17	20	20
With gas only	1	3	11	8
With neither	1	1	3	2
Total with electricity ...	98	96	86	90
Total with gas ...	79	82	77	78

Class AB: well-to-do and middle classes; Class C: lower middle classes; Class DE: working class and poor.

A new departure in this year's survey is an analysis of television ownership and habits. In this respect, it is important to remember that the figures were taken before the keenness to obtain a television set to view the Coronation took its full effect.

TABLE 2.—POSSESSION OF TELEVISION SET IN THE HOME

Classification	% of total adult pop.	Classification	% of total adult pop.
		Age	
All adults...	16·1	16-24	15·7
Men ...	17·2	25-34	16·3
Women ...	15·0	35-44	20·0
Class A ...	37·5	45-64	16·1
Class B ...	29·2	65 and over	10·3
Class C ...	20·2		
Class DE ...	12·6		

One of the most interesting tables sets out the length of time for which people have owned television receivers. This shows that whereas prior to 1949 some 40% were in class AB and only 36% in the numerically far greater class DE (see footnote to Table 1), the present pattern for sales is 19% in class AB and 59 per cent in class DE. Table 2 sets out percentage figures based on the question "have you a television set in your home."

American Techniques

Recent Developments in the Electrical Field

CONSIDERABLE economies, allied to rapid and easy installation are claimed for a mechanical cable-laying system used by the Omaha Public Power District, Nebraska. The method also eliminates the need for and the expense of manholes, small roadway boxes being sufficient to mark the splices and permit inspection.

It is claimed, according to an article in *Electric Light and Power*, that the mechanical system can install and cover 1,000 ft of 0·274 sq-in. section three-core, armoured, paper-insulated and lead-sheathed cable in an eight-hour day. The laying equipment comprises a tractor, a trenching machine mounted on a jeep, a flat-truck trailer carrying a reel of cable, a truck carrying a supply of creosoted pine planks, 2 in. thick and 8 in. wide, and a scraper and utility truck with an air compressor in tow.

Method of Laying

The cable is laid behind street kerbs where possible, the pavement being broken directly above the area selected for the route. First the trenching machine opens a short section of trench, about 10 in. wide by at least 36 in. deep. The earth thrown back by the trencher provides a soft cushion for the cable. As soon as each short section has been opened, the cable is unreeled and laid in the section, care being taken that the bedding or earth cushion is clean.

A backfill of earth 6 in. deep is then placed over the cable, and air-operated rams, powered by the compressor, are used to make it firm. Over the backfill are placed the creosoted planks, giving some degree of mechanical protection to the cable, while finally another layer of backfill is put down to the depth required by the surface.

Jointing

The cable is normally purchased in convenient 1,000-ft lengths so that a joint is required at this interval. Near the end of each length of cable an excavation is made at one side of the trench to make room for the jointing operation. The minimum of armour is removed and a conventional joint made. A box of creosoted planks is installed around it and filled with compound. The box is made large enough to contain the joint and extends at least 6 in. on to the armour of the cable. Care is taken to make the box tight and a snug fit on to the cables themselves so that compound will not spill out. A round-headed roadway box is then installed directly over the centreline of the joint to mark its position.

Greases for Bearings

Tests carried out in a steelworks at Pittsburgh, using a lithium 12-hydroxy stearate grease, have shown that it is well suited for general lubrication use under the arduous physical conditions of rolling-mill use. The soft, pliable texture permits easy pumping over a relatively wide range of temperatures and its high water tolerance contributes to operational safety and efficiency. This grease is now applied to some 3,000 of the 7,000 overall lubrication points of the mill, including electric motors, cranes, coil conveyors and driven rolls of the mill run-out tables. The grease was particularly good for withstanding the hazards of heat, water and heavy shock loading experienced in the automatic coiler which uses fast motors for pull-up. Here the lubrication period was greatly prolonged resulting in less idle machine time. On the run-out tables, according to *Steel*, grease consumption has been cut 50% and the life of the roller bearings increased by about 90%. Now one roll is changed per week, instead of 12 to 15 rolls as previously and a bearing lasts from a year to one and a half years compared with six months.

Gas Insulation

It is interesting to note that the use of sulphur hexafluoride as an insulant is gaining ground in the United States. The leading features of this heavy non-toxic gas were described in the ELECTRICAL TIMES, December 31, 1951. The main attraction, quoted in *Chemical Processing*, lies in the saving in weight and size which can be obtained by using SF_6 in place of liquid insulants. This saving is partially due to the comparatively low pressures which are developed if failure occurs, and also due to the high dielectric strength which allows for closer spacings of "live" and "dead" components.

Speedy Filling of Fuel Tankers

Electrically-driven Pumps Deliver 250 Gallons/Minute

AN extensive electrical system has been installed at the new Pickering Depot of Shell Mex and B.P. Ltd., which is a main distribution centre for petrol and oil products. In order to ensure a satisfactory and efficient depot layout, scale models, made in plastic, of the buildings and equipment were made and manipulated until the most efficient disposition was decided upon.

The depot, apart from its distribution function, also includes a vehicle servicing bay combined with a lubricating oil packaging centre. The servicing section is fitted with recessed lighting, and the latest types of pressure greasing and power-washing plant are installed. Compressed air supplies are given by a multi-point air compressor.

A storage compound contains two vertical tanks, each holding 86,000 gallons and fourteen horizontal tanks, each of 12,000 gallons, making a total of some 340,000 gallons. Each tank is fitted with a pneumatically operated gauge which shows automatically how much it is holding.

In the main pumphouse are ten motor-driven centrifugal pumps each delivering 250 gallons/minute and controlled by push-button switches on the filling gantry. The motors are English Electric 15 h.p. 400 volt three-phase flameproof units and are star-delta started. The reason for adopting this type of starting (which requires special flameproof contactor gear) is that with the high pump capacity avail, the filling of a convoy of tankers, of which six may be filled simultaneously takes but little time, and there is a high probability that several motors may be started instantaneously with consequent heavy loading of the incoming mains.

Each pump deals with its own individual fuel, although twelve outlets, each with a filter, air separator, positive displacement

The pumphouse, showing flameproof contactor gear, motors, and lighting fittings

meter and spring-balanced loading arm, are provided. In order therefore to avoid the possibility of one pump being used to fill two tankers simultaneously, a light signalling system has been installed which allows the operator on the filling gantry to see which pumps are in use. This switchgear was manufactured by Allen West Ltd.

In addition to the main pumping system there is also a small displacement stripper pump, driven by a four h.p. motor, for general duties.

For emergency operation a master tripping circuit has been included which simultaneously cuts out all pumps which may be working by tripping out the main pumphouse circuit-breaker. Earth leakage protection has also been installed although this provided severe technical problems due to the high soil resistance in the area. Although a river runs near the site, and the ground would appear suitable, it was found that normal earthing methods were insufficient to obtain a good enough earth to operate the protection at its rated value. This was due to the fact that the top soil, although comparatively thick, rests on solid rock. As an alleviating measure cast iron pipes have been sunk at suitable places and it is possible that a special earth system may be brought in from the Yorkshire Electricity Board substation.

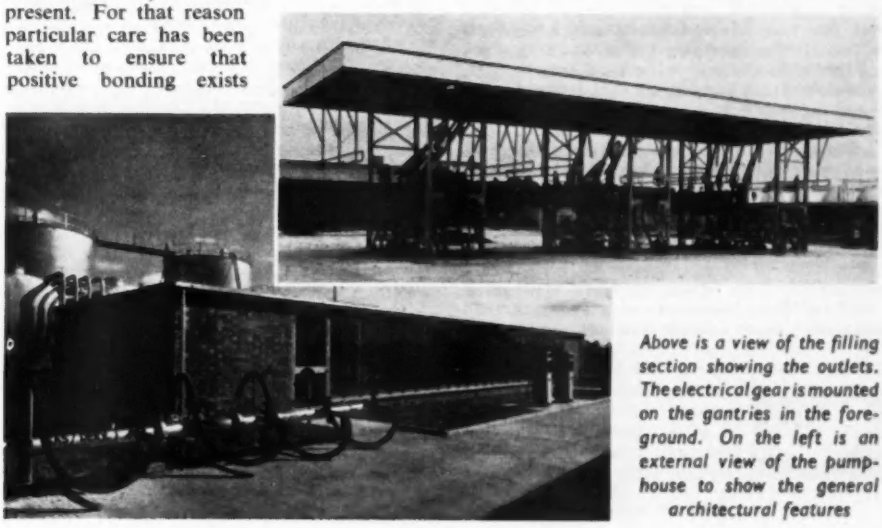
The general question of earthing is, of course, of primary importance in an installation where inflammable vapours may be encountered and where, also, the hazard of static electricity is ever present. For that reason particular care has been taken to ensure that positive bonding exists throughout the plant, and in fact the "Portaway" earth continuity system, made by Porter Electrical Products of Leeds, was used.

To aid in night working a comprehensive system of electric lighting has been installed. This involves exterior floodlights using 500 or 1,000 watt tungsten bulbs in Holophane fittings and local lighting below the roof of the tank wagon filling structure which occupies an island in the centre of the yard. The fittings are, of course, of approved pattern for dangerous areas. Two-way loudspeakers link the offices with the filling gantry, tank compound and oil package building.

The depot serves an area within a radius of thirty-five miles of Pickering, formerly fed from depots at Scarborough, Whitby, Malton and York. The electrical installation was carried out by Troup Curtis and Co. Ltd., starters and control gear by Allan West and Co., pumps by Drysdale and Co. Ltd., motors by English Electric and lighting by Holophane.

Opening Ceremony

Speaking at the opening ceremony Mr. C. M. Vignoles, Managing Director of Shell-Mex and B.P., pointed out that the new refinery plants were being made the focal points of the petroleum distribution system, and would deliver direct by road to consumers within a radius of about 60 miles. Pickering, however, was only the first of 15 new depots in the U.K. and Northern Ireland and was a major advance in the field of fuel distribution.



Above is a view of the filling section showing the outlets. The electrical gear is mounted on the gantries in the foreground. On the left is an external view of the pumphouse to show the general architectural features

overseas news

Power Rights Transferred

As the result of a deal with the Vancouver City Council, the British Columbia Electric Co. has become the sole owner of all potential hydro-electric sites for the Vancouver area and the British Columbia coastal district. In this deal the city council has abandoned rights it has maintained for 30 years on a possible sight for a dam and power station on the Cheakamus River about 70 miles north of Vancouver. This site, it is estimated, could produce about 160,000 h.p., but at the moment the British Columbia Electric Co. proposes to hold such a scheme in reserve, and it seems unlikely that construction would begin before 1957, although a detailed survey is to be undertaken immediately. It was in 1923 that the then Mayor of Vancouver secured government approval for the reservation of power rights over the Cheakamus River, but the city has since made no effort to develop its potentialities, and locally, it seems, the action was taken mainly to provide a bargaining point in fixing electricity tariffs with the British Columbia Electric Co.

Discussions on St. Lawrence

Preliminary discussions began in New York last week between engineers of the New York State Power Authority and the Hydro Electric Commission of Ontario regarding the St. Lawrence seaway and power project. There is, of course, still a lengthy waiting period during which legal action may possibly arise, but now that the two power organisations have been named it was considered that an early "get together" was essential. The latest action of the U.S. Congress in shelving till next January a Bill proposing American participation in the navigational side of the scheme, has encouraged Canadian officials to declare that the seaway will be carried out on the Canadian side of the River, while the New York and Ontario power concern can operate jointly in building the dams to hold up the water. The Hydro Electric Power Commission are already well advanced in the preparation of their plans. At last week's meeting the New York engineers were given details of the advance of the plans since 1942 when the scheme was last seriously considered.

Development Approved

The decision of the United States House of Representatives which authorises the Mohawk Power Corporation and four other New York utility companies to construct and operate a $400 million development to increase the power output of Niagara Falls on the American side, is being hailed in the States as a big boost for private enterprise. Under the proposals to which we referred on July 30, the power development will provide a further 8,600 million units annually.

Greece's Power Expansion

The Aliveri steam power station on the island of Eubola in Eastern Greece, was formally inaugurated recently at a ceremony attended by King Paul. Equipment from America, Britain, Germany and Italy has been installed in the new station, the first to be constructed under Greece's power programme. The station is to be of 80 MW capacity, but initially only one 40 MW set is operating, the other will follow shortly. Lignite is used for fuel, of which there are plentiful supplies in the area. The station is being interconnected with two oil-burning plants of the Athens-Piræus Electric Co., and later, with other systems. The station is the first of four under construction. These are the 5,000 kW hydro-electric Louros plant, which should be in operation before the end of this year, the Vodas 40,000 kW hydro-electric station scheduled to be ready early next year, and the 50,000 kW plant on the Ladhon River which should be in commission in 1954. A country-wide 150 kV transmission scheme is also being erected, involving 700 miles of line. About 60% of this network is already installed and the remainder is expected to be completed next year. Much of the necessary finance has been provided from Marshall Aid funds, and the rest from Italian war reparations and Greek drachma payments, the latter being largely counterpart funds.

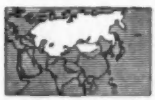
Money for Palestine

The question of additional capital, the thorny problem which has beset the Palestine Electric Corporation for the past year, was the subject of recent discussions between representatives of the company and the Israeli Government as the result of which the latter has now agreed to invest £7 million (Israeli currency) in the Corporation, in order to increase the country's power production. Much of this will go towards the capital expenditure programme of the company, including the two new 50 MW generating sets to which we referred last week. But there is also a suggestion for the construction of a new power station.

British Plant for Turkey

Metropolitan-Vickers Electrical Co., Ltd. have obtained a contract from the Turkish Etibank providing for doubling the capacity of the Chatalagzi power station situated about seven miles outside Zonguldalk. The original contract was placed with Metropolitan-Vickers early in 1939, and provided for the installation of three 20 MW steam generators, with Babcock and Wilcox boilers utilising low-grade coal and coal waste. This second section is essentially a duplication of the first 60 MW stage. Babcock and Wilcox will supply the boilers, with Braithwaite and Co. doing the civil engineering work, and Dorman and Long the steelwork. The cost of this new extension is put at £3½ million. It is to be completed within two years. The initial station has been running for nearly 4 years, supplying power to the Zonguldalk coalfields. The new extensions are believed to be required to deal with Ankara's expanding needs.

Russian Policy



During the course of his survey of Russian Policy at the Supreme Soviet in Moscow last Saturday, Mr. Malenkov spoke of the growth of output in the basic branches of heavy industry. It is estimated that the output of electricity this year will amount to 133,000 million units—2·8 times more than in 1940. Later, he reflected on the advance made since 1924-25, when, on the eve of the fourteenth party congress, it was decided to industrialise the country. At that time, output of electricity was less than 3,000 millions units, Russia being the lowest in comparison with the large capitalistic countries, he said. It was proposed to continue in every way to develop heavy industry, metallurgy, the fuel and power, chemical and timber industries. The state budget also provides appropriations for carrying out new, additional measures for considerably improving the mechanisation and the electrification of agriculture both by means of building new power stations and by connecting the machine and tractor stations, the collective farms and the State farms to the State power systems, he declared.

Madras Report

Despite the recurring power shortages in the State, the report of the Madras Government Electricity Department for the year 1951-52 shows a net surplus of Rs. 167 lakhs. Over 800 million units were generated during the year, compared with 681·5 million in the previous twelve months. Industrial supplies consumed 62% of the output, while domestic light, heat, power and fans took only 10%. The total revenue for the year, at Rs. 471 lakhs, was 24·8% higher than in the previous year. Consumers served by all the undertakings in the State totalled 339,605, of whom nearly 64,000 were added during the year. Although 27 local authority and private electricity undertakings were vested in the Government during the period, ten of the undertakings questioned the validity of the 1949 Acquisition Act and an appeal is pending before the Supreme Court. There are two other questions being asked in the State which are as yet unanswered. The first relates to the formation of a State Board—the Madras Government seems to oppose the proposal—and the second concerns the establishment of a steam power station, probably of 100 MW capacity, which some consider should be built in the South Arcot District in order to provide firm power to offset any periods of drought.

Gas Turbines for Brisbane?

The possibility of utilising gas turbines for power generation in Brisbane was one aspect of investigations now being made in Britain and the Continent by two officials of the Brisbane City Council Electricity Department, Ald. W. C. Coutts, chairman of the Transport and Electricity Committee, recently stated. He was referring to the visits of Mr. E. Sands, deputy manager in charge of distribution, and Mr. C. A. M. Weller, generation engineer, whose arrival in this country we exclusively reported on April 9. These two officials have already visited Trafford power station, Manchester, and Switzerland, where gas turbine generators are in operation. They are expected to return to Brisbane early in October.

Diesel Station

A new diesel generating station at Parkes, New South Wales, was formerly inaugurated a few days ago by Mr. Renshaw, Minister for Local Government. The station has four 1,480 kW generators, and power will be fed into the state's interconnected electricity system.

A Rural Expansion Plan

In the survey of the power situation in Victoria, Australia, recently given by Mr. R. A. Hunt, chairman of the State Electricity Commission, to which we earlier made brief reference, it is stated that a total of 200 MW of additional generating capacity will be installed over the next two years. The Commission has, of course, had its loan funds severely curtailed, with a consequent restriction on the development programme. But the Electricity Supply Department is exploring all avenues in an effort to extend service to new consumers. As a result, during 1952 a record number of nearly 30,000 new consumers were connected, of whom 70% were outside the Metropolitan area. They included 2,570 farms. In this work the "Self-Help" scheme has proved invaluable. Rather than let rural electricity development languish completely, the Department is now pressing on with extensions to consumers who will lend the Commission the whole cost of constructing the extension. Under this, the Commission pays interest on the money and offsets electricity accounts against the amount of the loan.

PERSONALITIES

IN THE INDUSTRY

Specialist lighting fittings representative of the General Electric Co., Ltd., **Mr. S. R. Bussey,** has retired. He started with the company in 1909 as a junior representative in the Fittings Department. He specialised in the lighting of stores, public buildings, theatres and cinemas, and was responsible for many such installations in London and the provinces. Under the direction of Sir Giles Gilbert Scott, and Oscar Faber and Partners, he was responsible for the lighting in the new House of Commons, including the cold cathode installation in the main chamber.

Mr. S. R. Bussey

Mr. J. L. Gaskell, B.SC.(ENG.), M.I.E.E., of the Appleby-Frodingham Steel Co., Scunthorpe, has been appointed a member of the Yorkshire Electricity Consultative Council.

A director of London Electric Wire Co. and Smith's Ltd. since its formation in 1909, **Mr. A. N. Smith** has been elected chairman of the company to fill the vacancy caused by the recent death of Mr. W. J. Terry.

M.K. Electric Ltd. have appointed **Mr. A. L. Phillips** to represent the company in the South-west of England and South Wales.

The Power Centre Co., Ltd., has appointed **Mr. R. Oakley** as technical sales engineer for the Midlands area. He will operate from the head office and works.

Four members of the staff of W. T. Henley's Telegraph Works Co., Ltd., whose total length of service with the company amounted to 170 years, were recipients of presentations made recently by Sir John Dalton, chairman of the company. The members were **Mr. G. E. Rhodes,** deputy general manager of Henley's, who had completed 50 years' service; **Miss K. E. Gilbert** private secretary to Sir Montague Hughman; **Miss E. S. Wiseman,** order clerk in the Rubber Cable Sales Section; **Miss G. D. Brown,** senior typist and clerk at Bristol branch, who had each completed 40 years' service with the company.

Sir John Dalton with the recipients: left to right, Miss G. D. Brown, Miss E. S. Wiseman, Miss K. E. Gilbert and Mr. G. E. Rhodes

Retiring at the end of this month after almost 42 years continuous service in the Electricity Supply Industry is **Mr. A. P. MacKim,** A.M.I.E.E., technical engineer to the South West Scotland Electricity Board. He commenced his career in 1904 in the private research laboratory of the late Prof. J. T. Bottomley of Glasgow University and served his apprenticeship with Kelvin and James White Ltd. Subsequently he joined the staff of the Clyde Valley Electrical Power Co. Ltd., and later transferred to the Glasgow Corporation Electricity Department. During this latter period he held the appointments of assistant executive for the standardisation of frequency in Glasgow, technical assistant to the management, and, for a short period prior to his present appointment, planning and development engineer. He has also taken an active interest in the affairs of the Scottish Centre of the I.E.E., and in the technical education of electrical apprentices in Glasgow. All his friends will wish him continued good health and a long and happy retirement. As from September 1, the South West Scotland Board has appointed **Mr. John Welch,** B.SC., M.I.E.E., as technical engineer on the staff of the chief engineer of the Board to succeed Mr. MacKim. Mr. Welch is at present senior assistant engineer (technical) on the chief engineer's staff.

Mr. A. P. MacKim

Mr. J. Grimston, M.P., a director of Enfield Rolling Mills Ltd., has been appointed managing director of the company in place of Mr. C. E. Frederick Plutte, who died recently. **Mr. B. Powell,** secretary of the company, has been appointed a director, as have **Mr. A. Lane** and **Mr. F. Cockayne.**

Mr. A. J. Brunker, B.Sc. (Eng.), A.M.I.E.E., has been appointed a director and general manager of Ekco Electronics, Ltd., the recently-formed subsidiary company of E. K. Cole, Ltd. He is general export manager of the parent company, and before the formation of the new subsidiary was also responsible for commercial activities of the Electronics Division of E. K. Cole, Ltd. Mr. Brunker joined Ekco in 1947 from the Ministry of Supply, where, for several years, he was Deputy Director, Radio Production.

Mr. A. J. Brunker

Mr. P. B. H. Brown, managing director of L. Sterne and Co., Ltd., has also been appointed vice-chairman of the company.

After 31 years' service with Essex County Council, **Mr. G. E. Slade,** chief mechanical and electrical engineer in the County architect's department, is to retire on September 28 on reaching the age of 65. He served his apprenticeship with the former Lancashire and Yorkshire Railway Co., including a period in the mechanical drawing office.

Mr. W. C. Handley has resigned from the Board of the Telegraph Condenser. **Mr. D. G. Grantham** has been appointed a director of the company in place of the late Sir Johnstone Wright.

On retiring from his position of deputy chairman of the North Western Electricity Board, **Mr. R. A. S. Thwaites,** B.Sc.(Eng.), M.Inst.C.E., M.I.E.E., M.I.Mech.E., was presented with a television set from Board members, chief officers and sub-area managers, and with a rustic table and chairs from the Headquarters staff and former colleagues in the Manchester undertaking. The presentations were made by **Sir Joseph Hallsworth,** chairman of the Board.

Mr. Thwaites, left, receives the T.V. set from Sir Joseph Hallsworth

Executive Director and General Sales Manager of Crompton Parkinson Ltd., **Mr. C. J. W. Scott** has been elected chairman of the Electric Lamp Manufacturers Association for the current year. He joined Crompton Parkinson in 1930 as sales engineer, and in 1939 was appointed assistant sales manager of the Lamp, Cables and Lighting Departments. In 1945 he became general sales manager of the Supplies division, responsible for the sales of lamps and lighting equipment, rubber cables and car starter batteries, and in the following year was appointed an executive director.

Mr. C. J. W. Scott

Mr. P. H. R. Durand, A.M.I.Mech.E., A.M.I.E.E., who has been appointed chief engineer with Ruston-Bucyrus Ltd., served his apprenticeship with the Macfarlane Engineering Co. Ltd. and was later appointed assistant chief designer and technical assistant to the managing director. He became electrical engineer to Ruston-Bucyrus in 1936, and until 1947 was responsible for the application of electrical power to their range of excavators. In that year, promotion to assistant chief engineer greatly enlarged the scope of his duties.

Mr. Theodore Berry, works manager of Drysdale and Co., has been appointed a director of the company.

Mr. G. R. Todd, A.M.I.E.E., has this month taken up his new duties as generation engineer (operation) to the South West Scotland Division of the B.E.A. He succeeded **Mr. W. Simpson,** Assoc. I.E.E., M.Inst.F., who as we have already noted, has been promoted to chief generation engineer (operation) in that Division. Since July, 1951, Mr. Todd has been station superintendent Dalmarnock, Glasgow, power station in the same Division, and from 1948 was deputy station superintendent at Kingston "B" power station. He had previously spent a year at Deptford West power station as boiler house charge engineer. A Scot, he was educated at Madras College, St. Andrews, and University College, Dundee, and gained practical training with Metropolitan-Vickers Electrical Co. Ltd., after which he returned to Dundee and served with the Corporation Electricity Department until 1947.

Mr. G. R. Todd

Mr. T. F. Lister, chairman and managing director of Hackbridge and Hewittic Electric Co., Ltd., has intimated that he wishes to be relieved of the day-to-day responsibilities of management when his agreement as managing director expires in March next year. Arrangements have now been made whereby he will be succeeded in the position of managing director by **Mr. Anthony M. Browne,** who has been associated with the group for 29 years. Mr. Lister will, however, continue as chairman. It is also announced that **Mr. R. G. Jones,** who has served the company for 25 years, will also retire from the position of purchasing director in March next. Mr. T. F. Lister first joined the Hackbridge Electric Construction, as manager, in 1925 after earlier experience with Ferranti Ltd., the General Electric Co., Ltd., and Metropolitan Vickers Electrical Co., Ltd. In the following year he also became manager of the Hewittic Electric Co., when that concern was acquired by Hackbridge. In 1931 he was appointed a director of both companies, and in 1944 managing director of those concerns and the New Switchgear Construction Co., Ltd. He was nominated chairman and managing director in 1946 and the following year became chairman and managing director of the newly amalgamated group, the Hackbridge and Hewittic Electric Co. He was also Chairman of the B.E.A.M.A. Council in 1951/53.

Mr. T. F. Lister

The Council of the City and Guilds of London Institute have conferred the Fellowship of the Institute (F.C.G.I.) upon five more past students of the City and Guilds College, in recognition of the contribution each has made to the advancement of the industry in which he is engaged. The five are: **Mr. J. D. Peattie,** B.SC., M.I.E.E., deputy chief engineer (generation), British Electricity Authority headquarters, **Mr. L. P. Coombes,** D.F.C., B.SC., F.R.AE.S., chief superintendent, Aeronautical Research Laboratories, Department of Supply and Development, Commonwealth of Australia, **Brigadier L. H. Harris,** C.B.E., T.D., M.SC., M.I.E.E., controller of research, General Post Office, **Mr. R. T. James,** O.B.E., D.I.C., M.INST.C.E., partner in R. T. James and Partners, consulting civil engineers, and **Sir Robin Rowell,** C.B.E., A.F.C., D.L., M.I.N.A., chairman and managing director of R. and W. Hawthorn, Leslie and Co., Ltd.

Previously district engineer at Barnet, North-met sub-area of the Eastern Electricity Board, **Mr. L. F. G. Baker** has been appointed district manager there by the Board, in succession to the late Mr. H. P. Guy.

A memorial service for the late **Mr. W. J. Terry,** who was chairman of the London Electric Wire Co. & Smith's, Ltd., and managing director of the Liverpool Electric Cable Co., is to be held at the Church of St. Martin-in-the-Fields today, August 13, at 12 noon.

A memorial service for the late **Sir Johnstone Wright** is to be held at The Queen's Chapel of the Savoy, Savoy Street, W.C.2, at 12.30 p.m. on August 24. The service will be conducted by the Rev. Prebendary E. H. Williams-Ashman, and a short address will be given by Sir John Hacking.

OBITUARY

Mr. James E. Edgecombe, M.I.Mech.E., M.I.E.E., who died at Surbiton on August 4, aged 87, was prominently associated with the Electrical Industry for many years. He started with Crompton and Co., and after a spell with the Kensington and Knightsbridge Electric Lighting Co. and the Notting Hill Electric Lighting Co., was appointed resident engineer during the construction of the Kingston-upon-Thames electricity works and became borough electrical engineer there in 1893. His period there was noteworthy in that horizontal diesel engines were later used for the first time for electricity supply purposes in England. He remained as chief at Kingston until 1918, when he became the first director of E.L.M.A. (or the Tungsten Lamp Association as it was then known), a position he held till retiring early in 1923. A founder of the Stearn Electric Co. in 1925, he remained a director until 1947. He also served as president of the I.M.E.A. in 1905 and 1912, as president of the Diesel Engine Users' Association in 1914, and as a member of the Council of the Illuminating Engineering Society, in addition to working on numerous technical committees.

Mr. F. Finigan, formerly business manager of W. T. Glover and Co., Ltd., died on August 3. He joined the company in 1912 and was joint sales manager for many years, later business manager. He retired in September, 1952, after 40 years service during which time he was closely associated with the activities of the C.M.A.

Commander Q. H. Bullard, who, until a month ago was managing director of Marconi (South Africa), Ltd., died on July 28.

Mr. H. D. Walsh, display and exhibition manager to Hoover Ltd., died on July 29, aged 46.

WILLS

Mr. Henry Humphreys, senior partner of J. H. Humphreys and Sons, left £35,146 gross (£35,052 net value).

Mr. R. R. Venning, M.B.E., manager of the Lighting Fittings Department of the Light Group of Philips Electrical Ltd., left £10,903 gross (£10,803 net value).

Mr. W. W. Gibbins, formerly chairman of the Birmingham Battery and Metal Co. Ltd., left £90,600 gross (£85,665 net value).

British Standards

Cartridge fuse links for use in plugs. *B.S.*1362: 1953. *Price* 2*s.* 6*d. net.* The most important feature of this revision of B.S.1362 is the increase in breaking-capacity rating for this type of fuse-link, from 1,000 to 6,000 A. Moreover, another change to be noted occurs in section 4, dealing with tests. Whereas the earlier standard specified a prospective current in the test circuit of 1,000 amp only, this revision requires this current to be 6,000 amp at a power factor of 0·4 lagging. Six fuse-links are to be tested at this prospective current, and another six at prospective currents not less than, and up to five times the value of, the minimum fusing current at any convenient power factor. Discrimination between fuse-links of different current ratings is not dealt with in this standard. The standard applies only to fuses for a.c. circuits.

Memorandum on Values for the Properties of High-conductivity Copper. *B.S.* 1989 : 1953. *Price* 2*s.* 6*d.* Because of anomalies in certain British Standards dealing with annealed and hard-drawn high-conductivity copper, the B.S.I. has issued this Memorandum to form a common foundation on which to base future British Standards and revisions of existing standards. It contains recommendations based on Publication 28, "International standard of resistance for copper" of the International Electrotechnical Commission. Values are given of resistivity, density, coefficient of linear expansion and constant-mass temperature-coefficient of resistance. Tables are given for converting resistances at one temperature to values at other temperatures. A note explains the effect of the change recently made from international to absolute electrical units.

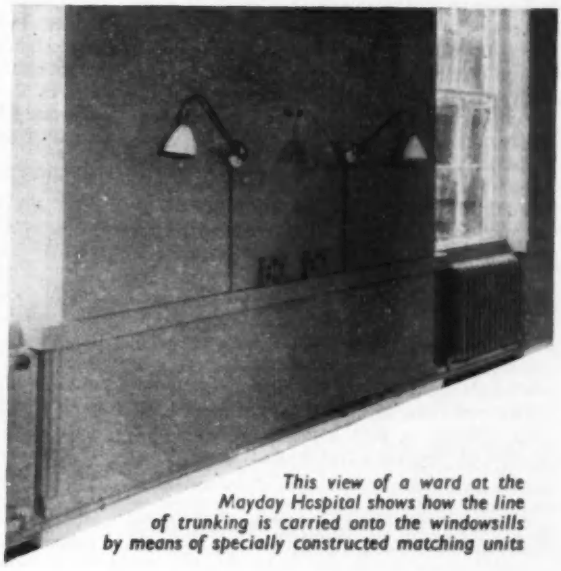
DUST-FREE WIRING

MULTI-CHANNEL cable trunking has been used with success at the Mayday Hospital, Croydon, to replace a mixture of capping and casing and steel conduit. Occasion of the change was the re-equipment of some wards to improve amenities. The responsible authorities decided that in the course of the work the existing electrical system should be replaced by some system which, although surface mounted, would be as inconspicuous as possible, and offer little opportunity for dust to settle.

Suitable trunking was in the event, manufactured by the General Electric Co., to a specification prepared by the consulting engineers, Barlow Leslie and Partners. Folded sheet steel is used to give a 4 in. by 2 in. duct, which a removable channel section separates into three compartments. Bed lights are connected to the trunking by steel conduit, while the bed head units are connected directly to the top of the trunking. Knockout holes are provided at frequent intervals along the entire top surface and channelways of the trunking. The top surface of the trunking is given a smooth finish to keep down the amount of dust adhering.

To facilitate direction changing where necessary special units have been manufactured following the window sills.

It is considered that the use of trunking in this installation has effected a considerable saving in maintenance cost and the comparative ease of making alterations has been specially valuable. The electrical contractors who carried out the installation were Troughton and Young Ltd.



This view of a ward at the Mayday Hospital shows how the line of trunking is carried onto the windowsills by means of specially constructed matching units

Research for Profit

Executives discuss the Commercial Utilisation of Industrial Research Results at F.B.I. Conference

RESEARCH is fashionable. Yet in spite of the great amount of attention given to its organisation in British industry, and the considerable sums of money expended in its name, there are frequent complaints of too long an interval between scientific discovery and the exploitation of that new knowledge in the markets of the world. These complaints, and their solution were discussed at a weekend conference on the commercial utilisation of research results, which the Federation of British Industries Research Committee organised in April. The report* now issued makes some provocative statements on this perennial subject.

A Sales Problem

Most challenging of the four sessions held was that dealing with the commercial utilisation of research results as a sales problem. In the introductory addresses two sales experts and two research executives discussed the question, with particular attention to the two-way traffic of ideas. Mr. O. Bertoya (General Sales Manager, Renold and Coventry Chain) considered that the sales section tells research of problems that exist: research tells sales of the things it has discovered or the thoughts it has had, and sales organise the action flowing therefrom. A third stream arises from the incidental discoveries of research while thinking about something else. Research should be familiar with at least the principal sales problems and of policy and aims; liaison meetings can help, but the availability of routine reports, backed up by regular informal meetings between higher sales and research officials seems desirable.

Mr. B. C. Fleming-Williams (Director of Research, A.C. Cossor), suggested that partway through a long development programme, it is possible by the use of a separate team to get equipment into production in a form of use to the customer. The main development programme can carry on and customer reaction provides it with a guide. Flow of information between sales and research is difficult to keep going, and he advocates bringing the research man into contact with the user. When the sale of systems as distinct from individual machines, etc., is concerned, the research department is probably the right quarter to accept sales responsibility.

Mr. L. H. Williams (Dep. Comm. Manager, Shell Petroleum), thought that senior commercial staff should be present on all research planning committees, both to contribute from their own knowledge of market intelligence and to take away information on the direction in which research programmes are heading. Equally, the research side should be adequately represented at all important sales conferences — "commercial research thinking requires to have its windows open at all times to the market air."

Friendly relationships between sales staff and research workers are important, and Mr. Williams considers that every salesman as part of his early training should spend a year or two in a suitable part of the laboratory. Senior sales staff should have unimpeded access to the laboratory for discussions at regular intervals, and in general selected laboratory staff should have access to the trade. In the latter case, however, the salesman should always lead the conversation.

Second speaker for the research side was Dr. H. E. Merritt (Humber Ltd.), who concentrated his attention on how the development of new products can be accelerated.

Departmental Relationships

In the ensuing discussions (held on the group system) it became clear that a satisfactory relationship between research and sales departments could not be so easily established as that between research and production. Sales representation on research committees was not common: a strong claim was made for the engineering department to act as a filter for ideas from sales, production and research. So far as research men and customers are concerned, it was felt that the increasing importance of selling new properties rather than quantity measured in numbers or pounds weight made it sometimes necessary for the suppliers' technicians to make contact with the purchasers' technicians.

---

* *Report of the Third Conference of Industrial Research Directors and Managers. Published by the F.B.I., 21, Tothill St., London, S.W.1., price 3s. 6d.*

The BUYER'S *Column*

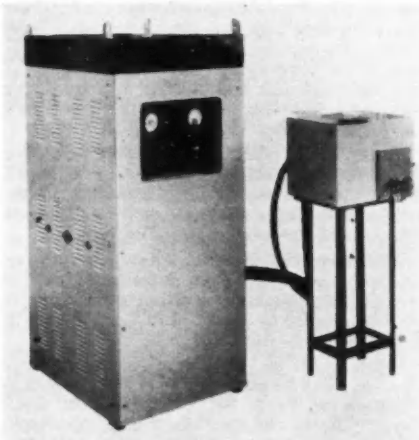
High-Impedance Voltmeter

A CATHODE-follower type electrometer voltmeter has been developed by the BALDWIN INSTRUMENT CO. LTD., Dartford, Kent. With an effective input resistance of 10^{13} ohms and an accuracy better than first grade to B.S.S. 89, the instrument may be used in several ways, for measuring small current, high resistance, potential charge or, indeed, almost any electrostatic phenomenon. The normal voltage ranges are 0-10, 20, 50, 100, 200, 500, and indication is by a 4-in. rectangular moving-coil microammeter with mirror scale and knife-edged pointer.

Improved H.F. Induction Heater

AN electronic heat generator of the induction type provides an excellent method of heating ferrous and non-ferrous metals. In the design of the new 5 kW electronic heat generator, type 850, manufactured by AIRMEC LTD., High Wycombe, Bucks, several of the disadvantages previously associated with earlier types of such heaters have been completely overcome, it is claimed. To enable a high standard of heating precision to be obtained, both manual control and facilities for automatic power control have been incorporated. In addition, a small remote work unit enables articles to be heated up to 12 ft away from the generator without any loss of power. Versatile output-matching arrangements overcome widely differing conditions.

The generator, continuously operated, is rated to develop a maximum power of 5.5 kW in the work. Its cost is claimed to be very moderate.



Airmec's electronic heat generator

Re-designed Storage Heater

THE thermal storage space heater manufactured by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. has been re-designed. Although similar in shape to the original heater, it now employs, for easier handling, 20 interchangeable concrete blocks which are only half the weight of those previously used. These are enclosed in a bronze finished steel case, the overall dimensions of which are slightly increased.

Lagging is fixed internally to the sides and ends of the case by mild steel strips. The top lagging, which accompanies each heater, is placed on the blocks after assembly. The eight self-tapping screws for locating the top of the heater have been reduced to two, one at each end. The terminal cover plate is also fixed by two screws only. Overall dimensions are 26½ in. wide, 11⅜ in. deep and 29½ in. high. Loading is 1½ kW, and, as already announced, the price is reduced to £12 10s.

A.C. Voltage Stabilisation

IN the electronic field there is frequently a requirement for a stable, automatically regulated a.c. output voltage which can be varied at will, and several circuits have been designed for this end.

A stabiliser, type A.C.1, now released for general sale has a remarkably high output for its size. It utilises a servo-mechanism, actuated by a sensitive comparator circuit to operate a variable auto-transformer. The rate of correction at full speed is 12 V/sec, and the effective time constant for the whole system is roughly 70 milli-seconds.

Normally the unit can be set to give an output voltage within the range 200-240 V at 0-10 amps, the input being allowed to vary between the limits of $-17\frac{1}{2}\%$ $+6\frac{1}{2}\%$ from the set output voltage. The output voltage is maintained constant indefinitely to within 1%, while an input frequency variation of 10% may result in a maximum change of 0·2% in the output voltage.

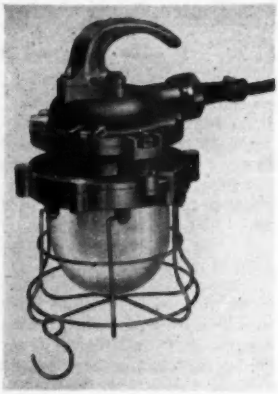
If required, however, provision can be made for maximum power to be drawn at any particular voltage up to 240. Thus the unit can be arranged to give 350 amps at 6·3 V.

A further arrangement which can be made is that two output supplies can be provided, both of which are stabilised against input voltage variations and one of which is fully stabilised against load variations.

Full protection is included and components are of the highest quality. Only one valve is used (available in the new "trustworthy" range) and no electrolytic condensers have been used. The size of the unit is 22 in. by 11 in. by 10 in. and its price £99. It is available from SERVOMEX CONTROLS LTD., Crowborough Hill, Jarvis Brook, Sussex.

Flameproof Handlamp for 250 V

A FLAMEPROOF handlamp for use in dangerous atmospheres as defined in B.S.S. 299—Groups II and III—and for which a Buxton certificate has been granted, is the latest introduction of SIMPLEX ELECTRIC CO. LTD., Broadwell, Oldbury, Birmingham. The handlamp is constructed of aluminium alloy. The connection box and top face of the body are flanged in the normal way and are jointed by four shrouded bolts. The well glass ring has a spigoted portion which assembles to the handlamp body, only two studs and nuts securing these two portions together—an important feature which allows for easy removal of the well glass for re-lamping.



For operation on 250 V a.c. supplies, the handlamp has been designed only for use with a special three-core 23/0076 cable having a copper braid screen and enclosed overall in a heavy duty Neoprene sheath. This cable can be supplied in lengths as required, or the handlamps are available already wired.

Instantaneous Water Heater

AN improvement to their "Gem" instantaneous domestic electric water heater is announced by RODWAY JONES AND CO. LTD., 36 Station Road, Westcliff-on-Sea. In this new model, dual control has been incorporated. It is stated that the electric heating cannot be switched on unless water is passing through the tubing. Its method of operation is that water passes through a valve-cock into the water chamber, and then in flowing through a transfer pipe into the outlet pipe makes contact between the earthed water heater and the electrode. As a result, current flows to a contactor which closes the main circuit to the element.

Cooling and Cleaning the Air

AN entirely British room cooler and dehumidifier suitable for home or office application has been introduced by CONTINENTAL COMPONENTS LTD., Hanover Buildings, 35-39 Maddox Street, London W.1. The machine will extract air from the room, take out smoke, odours and the like at the rate of 10 c.f.m., with the outside fresh air controlled by simple flap operation, varying air flow as a complete air conditioner or as a ventilating unit. Fresh air is drawn in, passed through filters and forced through the evaporator by the fan and passed to the room as cool, clean, refreshing air.

The sealed compressor unit, carrying a five-year guarantee, is operated by a $\frac{1}{6}$ h.p. capacitor start motor, while the shaded pole motor for the condenser fan is rated at $\frac{1}{40}$ h.p. and that of the cooling fan $\frac{1}{80}$ h.p. For operation on 110/115 V 60 c/s or 220/250 V 50 c/s, the machine is $13\frac{1}{2}$ in. high by $25\frac{3}{4}$ in. wide and $25\frac{1}{4}$ in. deep. When fitted in a wall the projection into the room is $11\frac{1}{2}$ in.

Grinder for Heavy Duty

A NEW 6 in. portable electric heavy duty grinder—type GQ6—which is claimed to provide a large increase in the rate of stock removal, is now being manufactured by WOLF ELECTRIC TOOLS LTD., Hanger Lane, Ealing, W.5. Powered by a specially designed motor which possesses phenomenally high speed/torque characteristics, the peripheral speed on the grinding wheel is 8,800 ft/min. For this reason it is fitted with a fast cutting resinoid bonded wheel, with a heavy gauge pressed steel guard to provide maximum safety. It is emphasised that ordinary vitrified wheels should on no account be used with this model. Heavy duty ball-bearings and resilient mounted helical gears are incorporated.

TRADE PUBLICATIONS

ELECTROSTATIC PRECIPITATION. Publication No. 7007 of this title, issued by Sturtevant Engineering Co. Ltd., Southern House, Cannon Street, London E.C.4, gives details of the principles and design of electrostatic precipitators made by that concern. Its 64 pages also include illustrations of many of the power stations and industrial works at which the plant has been installed.

COMPONENTS.—The immense variety of components made by A. F. Bulgin and Co., Bye-Pass Road, Barking, for the electrical, radio, television, telecommunication and electronic industries are illustrated in the revised edition of their catalogue just issued. The firm have also released a booklet illustrating the company's works and activities.

NICKEL.—The June issue of the *Nickel Bulletin*, issued by the Mond Nickel Co., Sunderland House, Curzon Street, W.1, includes an article on the composition, physical and mechanical properties of alloys of the Hastelloy type.

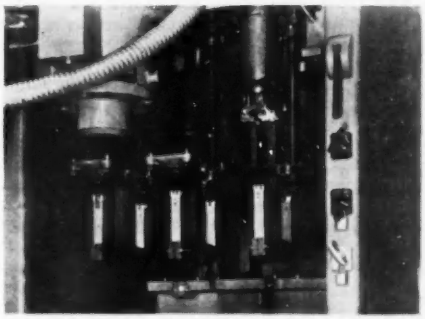
BROADCAST EQUIPMENT.—A new brochure on sound broadcasting equipment for installation in schools, hospitals and industrial establishments has been issued by Audix B.B. Ltd., Hockerill Works, Bishop's Stortford.

FURNACES.—The electric furnaces, pottery kilns and kilns for glass annealing and enamelling manufactured by R. M. Catterson-Smith Ltd., Adams Bridge Works, Exhibition Grounds, Wembley, Middlesex, are featured in new leaflets issued by that concern.

A Versatile Circuit-Breaker

New Design Can be Used in Several Ways

A NEW metal clad circuit-breaker, the Reyrolle type L42T, rated at 750 MVA, 33 kV, has been designed to meet a demand for switchgear occupying the least possible space and giving the greatest ease of operation. Only one construction of circuit-breaker is required, whether it be for single busbars or duplicate busbars, and it can be used for feeder, generator, transformer circuit, busbar-sectioning or busbar coupling duties. Provision is made for earthing busbar or line by a novel method requiring



Contact assembly of Reyrolle L42T circuit-breaker

no ancillary equipment, and the arrangement is such that line or busbar is earthed within its own zone of protection.

In order to provide these facilities, the circuit-breaker must be easily moved to plug into the required busbar or earth sections. Lifting of the breaker is therefore carried out hydraulically, lowering by gravity, and traversing by hand. The operation is so simple that it is possible to transfer a circuit from one busbar to the other in less than three minutes.

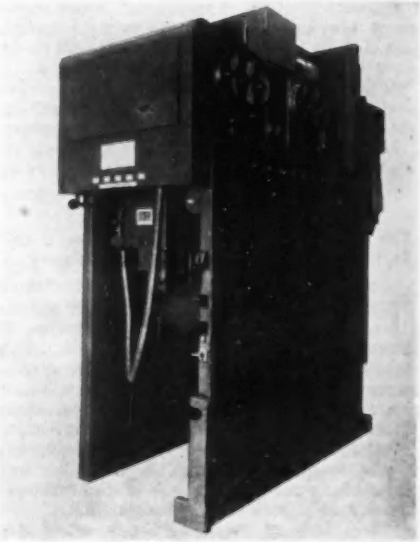
Full interlocking of the various operations involved in the transfer of the circuit-breaker is provided. The electro-hydraulic lifting ram cannot be raised unless the transfer carriage is at one of the correct positions, and the circuit-breaker cannot be raised without the tank (except in the special maintenance position). Anchor bolts cannot be inserted without the presence of the secondary connection plug box, and until these bolts are in position the breaker cannot be closed. On the other hand, when the breaker is closed the anchor bolts cannot be removed.

When the breaker is to be used for busbar or circuit earthing the carriage cannot be locked in the selected position until a special key has been obtained.

Construction

The breaker itself is fully phase-operated and has two breaks per phase. Solenoid-operated closing is employed, and a special attachment containing a closing spring is provided for emergency hand use. All maintenance can be carried out with the circuit-breaker moved forward to the front of the panel. A light three-wheeled truck is provided for transport of breakers between panels.

Single or duplicate busbar panels are available with sheet-steel double-barrier frame-standards. The busbars themselves are made of circular solid copper-rod, tape-insulated and supported in compound-filled chambers. Two ratings, 1,200 and 1,600 amps are available. Bar-type brushing-mounted C.T's are mounted behind sheet metal covers at the top of the fixed portion and can be removed on site; while the voltage transformer is mounted behind the circuit-breaker.



General view of the assembled circuit-breaker

NEW LITERATURE

General Transmission and Utilisation of Electrical Energy

by A. T. Starr, M.A., Ph.D., M.I.E.E.

FIRST published in 1937, this book, specially designed for the "electrical power" syllabus of the Engineering Degree, was a most welcome addition to the text-books available. Its popularity can be gauged from the fact that since that date it has been through two further editions and three reprints were required for the 1941 edition. Now it has again been revised, the principal addition being an appendix on rectifying plant.

For its main purpose, the volume is still excellent—the fundamentals of electricity do not change a great deal with the passage of time. One of its main attractions for the student, however, was its practical approach to the general subject, and on this side some revision is needed to bring it more in line with modern methods and standards. Much of the information given is outdated, and the examples of steam and hydro schemes are scarcely modern, nor has much of the data on world production of fuel, availability of water power, etc., been revised to cover the past ten years. Published by Sir Isaac Pitman and Sons, Ltd., 517 pages, 8½ in. by 5½ in. Third edition, price 20s.

Power Station Work

Edited by E. Molloy

FOR the electrical engineer requiring a general introduction to the construction and operation of power station plant, this volume in Newnes "Practical Electrical Engineering" series should prove most welcome. It is well illustrated throughout, and its explanations are simple and readily understood. The book contains nine sections, the first being historical and general and the next four dealing with plant details. Two further sections describe the duties of control and charge engineers while finally there are notes on fire protection and on hydro-electric stations. Published by Newnes, 164 pp., 9 in. by 6 in. Price 17s. 6d.

The Magnetic Circuit
Soft Magnetic Materials used in Industry

by A. E. de Barr, B.Sc., F.Inst.P.

THESE two booklets were amongst the first to be published in the "Monographs for Students" series which is being published by the Institute of Physics. These texts are intended especially for H.N.C. students studying advanced physics, and for undergraduates in the early years of their studies, but their clear presentation and modest price will earn them a far wider readership, if these initial examples are a fair guide. Although these books are planned to build into a comprehensive series, each is complete within itself,

"Soft Magnetic Materials" gives much of its space to concise account of the domain theory of ferromagnetism, and to the underlying magnetic considerations. It also discusses the special properties of commercial magnetic materials, and the peculiarities of silicon-iron and nickel-iron alloys in particular. "The Magnetic Circuit" carries the study forward to the form in which magnetic materials are applied, and to such special topics as powder cores, ferrites, and—the longest section—permanent magnets. Both volumes are illustrated with simple but clear curves and sketches. Published by the Institute of Physics, 47 Belgrave Square, London S.W.1, each 62 pages, 7¼ in. by 4¾ in. Price 5s. each.

Information Theory

by D. A. Bell, M.A., B.Sc., M.I.E.E.

BOTH in telecommunications and in automatic control system engineering there has been an increasing interest in "information theory"—the basic theory of the efficiency of performance of communications systems. In this most welcome volume the author abandons the advanced mathematics associated with rigorous proofs to express the results of recent developments in terms of the mathematical equipment of an honours graduate in engineering. In the whole length of his treatment of this complicated subject, the author keeps admirably close to practical engineering considerations, a fact which makes a difficult book surprisingly readable. Published by Pitman, 138 pages, 8½ in. by 5½ in. Price 20s.

Power Cables

by C. C. Barnes, A.M.I.E.E., A.I.I.A.

CABLE design is basically simple: but high quality can be obtained only if the closest attention is given to a large number of details. It is with the explanation of these details to the student and the user that the present volume is concerned, as No. 14 in the publisher's "Monographs on Electrical Engineering." Because it is concerned with details, rather than with the development of generalities, the text suggests a reference volume rather than the usual text-book, but though the necessary "bittyness" may be comparatively unattractive to the student, it is of great assistance to the practising engineer, who knows that he will find hard facts in the sections to which he is directed by the usefully full index provided.

A brief general discussion of cable design soon gives way to a study of the mechanical and electrical characteristics of present-day construction. Manufacture and raw materials are discussed, and there are lengthy sections on installation, maintenance and fault location. This welcome volume concludes with an extensive bibliography and a series of 28 appendices, largely tabular or mathematical. Published by Chapman and Hall, 272 pages, 3½ in. by 5½ in. Price 35s.

The WEEK in NEWS

Scottish Electricity Bill

New Legislation expected During Next Session

NOW that Parliament is in recess it is expected that wheels will begin to turn increasingly faster in the preparation of a Scottish Electricity Bill. Appeals that the whole of Scotland should be a separate entity as far as electricity is concerned became vehement about a year ago, when the Scottish Unionist Party emphasised the matter in a progress report. Now it is confidently expected that the Bill will be referred to in the Queen's Speech announcing legislation for the new session of Parliament beginning in November. Meanwhile it is authoritatively reported from Scotland that the possible unification of all three authorities is a thing of the past and that the N. of Scotland Hydro-Electric Board will remain separate. It is stated that officials are working on the idea that the S. East and S. West Electricity Boards will be amalgamated. The Hydro-Electric Board, while retaining its identity, is expected to have representatives on a joint committee.

Readers will probably recall that soon after the agitation began afresh, Mr. Thomas Johnston refuted any suggestion that the N. of Scotland Board should lose its present identity. At the opening of the last Parliamentary session the Queen stated that the question of the supply of electricity in Scotland was being attentively examined with a view to legislation.

Scottish Tariffs to be Reviewed

IT is already known that a number of Electricity Boards, and/or their Area Consultative Councils are to examine latest adjustments to discover possible anomalies in and fairness of existing charges. The S.W. Scotland Consultative Council has now decided to follow this course and is to set up a sub-committee for the purpose in the autumn. Mr. J. D. Kelly, chairman, pointed out that the Board would soon be reviewing tariffs, and urged that the Council should be prepared. When the sub-committee had reported, it would then be decided whether or not any suggestions should be forwarded to the Board. He and other members asserted that several organisations and persons had very decided views on present tariffs, and it would be better if proposals were put forward before tariffs were altered.

B.E.A.M.A. DINNER

THIS year's dinner of the British Electrical and Allied Manufacturers' Association is to be held on November 16 instead of November 18, as previously announced. Venue will be Grosvenor House, London W.1.

MORE COPPER CONTROLS LIFTED

THE export of semi-manufactures of copper and copper alloys will not be restricted on supply grounds in future, the Board of Trade announced last weekend. This restriction will no longer be necessary, it was stated, in view of the improvement in supplies of the metal. As previously announced, exports of semi-manufactures are now allowed to the Commonwealth, the U.S. and to Eire, without a licence. This relaxation became effective last week. Licences will still have to be obtained for exports to other countries, but it is understood they will be granted freely.

Engineers' Wage Claim

THE claim of the Confederation of Shipbuilding and Engineering Unions for a wage increase of 15% in the engineering industry has been endorsed at a recalled delegate conference of the Amalgamated Engineering Union. Union leaders had already supported the claim. It was decided that the conference should be recalled again when the employers' reply had been received.

The First Half-Century

The First Lord of the Admiralty has given electricity an unsolicited testimonial of the handsomest kind. He says that all our dockyards are to have complete electric light and power equipments because only thus could they be lighted in the best way and provided with the most economical and efficient form of motive power. With electric light work could be carried on by night just as well as by day, a vital advantage in time of war, and obviously the only light for magazines was the electric. The dockyards were supplied at present by scattered and uneconomical steam-engines and so forth, but electricity would change all that and would further give him an excuse for scrapping most of his present tools and installing the most up-to-date machinery in every respect, so that the Admiralty yards would be models of modern practice.—*From our issue of August* 13, 1903.

Hong Kong Engineers form Joint Group

FORMATION of a local Joint Group of the three Institutions of Civil Engineers, of Electrical Engineers and of Mechanical Engineers embracing all members of those Institutions resident in the Colony was announced by the outgoing president, Mr. P. V. Reveley, when he presented the report for the 1952-1953 session of the Engineering Society of Hong Kong at the annual meeting.

The formation of the group has been authorised by the Councils of the three Institutions. This group automatically embraces all those members of the Institutions resident in the Colony and has now entered upon its first session of active existence.

25 Years of Aluminium

IN over 100 pages of a commemorative book just produced by Aluminium, Ltd., is contained the story of aluminium and the activities of peoples all over the world engaged in the production and utilisation of that important commodity. Reason for the publication is the company's silver jubilee, and "Aluminium Panorama," as the book is entitled, explains and details the growth of this Canadian company and sundry applications of aluminium.

OFFICIAL PUBLICATIONS

ROYAL FINE ART COMMISSION. Eleventh report for 1952. H.M.S.O., 6d. (*see page* 288)

EXPENDITURE OF COUNTERPART FUNDS FROM U.S. ECONOMIC AID. H.M.S.O., 4d. (*see this page*)

REPORT OF H.M. CHIEF INSPECTOR OF MINES FOR 1951. H.M.S.O. 2s., (*see page* 292).

ELECTRICITY ACT, 1947. Report on Investigation under Section 38(i). H.M.S.O., 3d. (*see page* 311).

CABLE AND WIRELESS, LTD. Report of Directors and Accounts for 1952-53. H.M.S.O., 9d. (*see page* 312).

SULPHURIC ACID (Prices) Revocation) ORDER, 1953. S.I.1160. H.M.S.O. 2d.

BELFAST CONTRACT

THE matter of Belfast's contracts for plant for the new power station West is not completely settled yet, it seems. An application is to be heard in Ulster Law Courts, Belfast, to restrain the Corporation from accepting without public advertisement a tender of Babcock and Wilcox Ltd. of the sum of £2,976,496 (to which we have earlier referred) for the supply of seven boilers and equipment for the power station. The application has been made by a firm of solicitors acting on behalf of a number of the ratepayers, we hear. The latter contend that the method of obtaining the contract was contrary to standing orders and statutory duty.

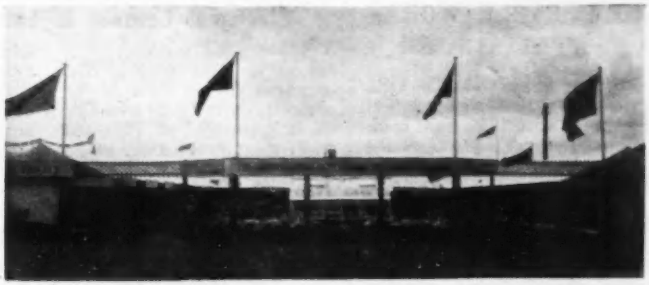
Extensive louvre lighting in British Railways' Travel centre

PRODUCTIVITY PLAN CATERS FOR SHORT TERM LOANS

DETAILS are given in a recently published White Paper of the planned expenditure of £3m of funds made available in connection with U.S. Economic Aid (see THE ELECTRICAL TIMES, 5th March, page 438). All this expenditure is aimed at increasing productivity in this country and it is noticeable that £125,000 is to go to research associations for the development of advisory services. Another £290,000 is allocated for the endowment of three chairs or readerships in engineering, one of which is to be in heavy electrical engineering (at Imperial College, London, it is hoped). One of the largest single items in the newly announced allocation is £700,000 as the capital of a "revolving loan fund" which will offer short-term loans to industry. An announcement is expected shortly, stating the types of loan which are likely to be approved

"Egg-crate" Lighting

VISITORS to British Railways Travel Centre in London's Lower Regent Street will notice a lighting installation remarkable for the extensive use which has been made of the egg-crate louvre. It must be one of the largest applications of this type of fitting, and the effects achieved are an admirable advertisement, particularly as the louvring is but 8 ft above the floor. In addition to lighting fittings, the louvres also hide heating and ventilating ducts, a sprinkler system, and mains for power and water. Five ft single lamp fluorescent fittings with natural lamps have been mounted in rows 1½ ft. above the louvres. These were supplied by the British Thomson-Houston Co. Ltd. Illumination at working levels is about 45 lumens/sq. ft., but by using pattern switches this can be reduced to 22, without impairing evenness of intensity. Contractors were N. G. Bailey and Co. Ltd.



Combined stand of the N.E. and Yorkshire Electricity Boards which was erected at the Great Yorkshire Agricultural Show, held at Harrogate last month

Ambitious Stand at Yorks Show

OUR accompanying illustration gives a fair idea of the ambitious stand erected jointly by the N.E. and Yorkshire Electricity Boards at last month's Great Yorkshire Agricultural Show held at Harrogate. In fact, the stand occupied some 10,000 sq ft, and the time and trouble spent in preparing such a large exhibition of agricultural and domestic equipment was amply repaid by the crowds of visitors.

Responsible for the agricultural exhibits this year was the N.E. Board, who adopted the instructional technique. There were dairies, cowsheds, barns, poultry section, fitting shop and sties, all self-contained units showing appropriate electrical apparatus. In one of the dairies the equipment shown was priced and totalled to give an example of the cost of a complete dairy. There was also a horticultural section. The Yorkshire Board took charge of the domestic section and exhibited a comprehensive range of appliances suitably displayed. Cookery and washing demonstrations took place throughout the three-day show.

Electricity to Farms

EVERY farm in southern Scotland from the Mull of Galloway to Loch Lomond will have electricity within the next three years, Mr. J. S. Pickles, chairman of the S.W. Scotland Electricity Board announced last week. The forecast was made at a celebration to mark the connection of the Board's 750,000th consumer.

British Association in Liverpool Next Month

THREE hundred and twenty scientists and technologists will deliver papers and lectures during the annual meeting of the British Association, which is to be held in Liverpool from September 2 to 9. The President this year, Sir Edward Appleton, will open the proceedings with an address entitled "Science for its Own Sake." There are several papers of electrical engineering interest programmed for presentation in sections G (engineering) and A (mathematics and physics). Notable amongst them is a paper by Dr. S. Whitehead of the E.R.A. on recent developments in dielectrics, while on the same morning there are papers on the mechanism of lightning discharges (Prof. J. M. Meek) and the generation of electricity in thunderclouds (Mr. B. J. Mason).

Titanium, of which so much is expected as a material of engineering construction, is to be discussed at a later session, and attention is being given to creep-resisting steels. Magnetic steels and some other aspects of ferromagnetism are also to be discussed. Future sources and uses of energy are to be dealt with in papers on economic nuclear power (Dr. B. L. Goodlet), solar energy (Dr. H. Heywood) and district heating (Mr. A. E. Margolis). Amongst firms arranging for visits from section G members are B.I. Callender's Cables; English Electric; and the Automatic Telephone and Electric Co.

C.M.A. Mark Missing from Cable

POWER cable supplied to the contractors to Wrexham Council were mentioned at a meeting of the council as not bearing the mark of the Cable Makers Association.

The Borough Surveyor said 14 yards of the cable had been used when it was discovered that the mark was missing. Work was immediately stopped pending inquiries.

It transpired that the cable although claimed to be up to the required standard by the makers, a London firm, for some reason which could not be explained, the mark was overlooked.

The Mayor (Councillor Herbert Jennings) failed to see what other course the Council could adopt than to accept the firm's explanation; a viewpoint which was accepted by the Council.

Electricians may Strike on Aug. 24

MONDAY week, August 24, has been fixed by officials of the Electrical Trades Union as the deadline for a settlement of their demand for a substantial wage increase for employees in the Electrical Contracting Industry. The E.T.U. presented its application for an increase in pay to the National Federated Electrical Association on March 24, but it was rejected in June. Now, unless the employers renew the negotiations, the E.T.U. may call a strike.

On Monday last, about 400 London members of the Union held a protest meeting in Hyde Park, and later went to the N.F.E.A. offices.

NEW CABLE WORKS AT HASTINGS

THE L.P.S. Electrical Co. Ltd., who have had a factory at Hastings since 1946, have completed arrangements for the construction of a new factory on the Ponswood Road estate, St. Leonards. Building work has now started, and it is expected that the main block will be completed early in 1955. This new manufacturing capacity will cater for the expanding demand for the firm's winding and instrument wires, small cables, etc. When fully operating, about 500 people will be employed at the new factory.

Publicity Material for Dealers

ON sale to the public for the first time on September 1 will be Remington Rand Ltd.'s new "60" electric shaver, but prior to that date the manufacturing company is making available a wide range of advertising material to stockists. Dealers will be able to obtain counter display cards, window streamers, leaflets and posters on application, and these will be backed by a large-scale advertising in the national daily, evening and Sunday newspapers as well as in popular weekly periodicals.

Electrical Courses in London this Autumn

A REMINDER that autumn is not so very far away arrived last week in the form of the prospectus for 1953-54 issued by the Department of Electrical Engineering and Applied Physics at the S.E. London Technical College. Among its pages we find, once again, a long and varied list of part-time, evening and full-time courses, all of which start in mid-September. One special series of lectures and practical laboratory periods to which we draw readers' attention is to be given by Mr. T. J. Lewis on "High Voltage Engineering." This course will consist of about 13 weekly lectures and 12 laboratory periods, beginning on October 13 and continuing on subsequent Tuesday evenings. It will be recognised for endorsement on Higher National Diplomas and Certificates. Applications to attend these lectures should be made by October 5. All other enrolments will take place at the college's main building in Lewisham Way, S.E.4, during the week beginning September 14.

The L.C.C.'s annual publication "Floodlight" is now available, price 6d.

Electrical Studies in Manchester

MANY specialised part-time courses in electrical engineering subjects are listed in a new booklet "Post Advanced Lectures in Electrical and Mechanical Engineering," which has been published by the Manchester and District Advisory Council for Further Education. (Address: Education Offices, Deansgate, Manchester 3.) Courses in electrical engineering at a lower level, available in and around Manchester, are conveniently summarised in "Engineering Education—Session, 1953-54," obtainable from the same address.

Electricity in Home Economics

WITH over 1,200 delegates from some 45 countries attending the International Congress of Home Economics in Edinburgh this week and next, E.D.A. have seized the opportunity to point out electricity's part in the mechanisation of the home. Facts and figures have been prepared showing how British housewives are aided in time- and labour-saving by electrical appliances at reasonable cost. During the Congress also a series of daily demonstrations of cookery and washing will be held at the George St. service centre. In addition, the Association is staging a small exhibition at the Edinburgh College of Domestic Science in Atholl Crescent, and we note that copies of a Braille edition of Ester Purvis' "Electric Cookery Book" will be shown for the first time.

A recent photograph of Broad Street, Fraserburgh, in Scotland, showing the new lighting installed by the G.E.C. In addition 1½ miles of the trunk road through this important fishing town and the main shopping centre also received attention. Eighty-six enclosed lanterns housing 140 W sodium lamps were used

Fuel Efficiency

A SERIES of special days, to enable visitors to the Fuel Efficiency Exhibition in Manchester to meet directors and representatives of firms in their area, are being sponsored by the exhibition organisers. Three have been arranged so far. November 24 has been set aside for West Riding visitors, and the following two days have been allocated to Midland and N.E. Coast interests. The exhibition is being held from November 18 to 28.

B.E.A.—N.o.S. Board Agreement Unchanged

No change in the statutory provisions for the purchase of electricity by the B.E.A. from the North of Scotland Hydro-Electric Board is to result from a recent statutory investigation. This was announced in a White Paper issued last week in which it was recalled that the 1947 Electricity Act required such an investigation to be made before August 5, 1953.

The White Paper points out that a ten-year agreement between the Authority and the Board is at present in force, and is due to run until the end of 1960. It is subject to review at the end of five years or in the event of a radical alteration in the structure of the B.E.A.'s tariff; but both parties to the agreement are so far satisfied with its working.

Taking into account the smooth working of this agreement, and the fact that there has never been need to invoke the Act's provisions for the calculation of a price in the event of disagreement, the Minister of Fuel and the Secretary of State for Scotland do not propose to make any order altering or modifying the existing provisions.

RUSSIAN CABLE CONTRACT FOR U.K.

A CONTRACT for 200 kilometres of electric cable valued at about £500,000 has been awarded by Russia to Crompton Parkinson Ltd. This was announced by the company last weekend. The placing of this contract followed initial negotiations with the U.S.S.R. trade delegation which visited England and later invited representatives of the company to Moscow. Delivery of the cable begins next month and will be completed by the end of the year.

Radio Components for Sweden

BRITISH radio and electronic components, valves and test gear, are to be exhibited in Stockholm from September 25 to 29. The exhibition, which is being organised by the Radio and Electronic Component Manufacturers Federation, will be held at the Kungshallen, Kungsgatan, where a similar display was held in 1948. Between 20 and 30 leading British firms are participating in the venture.

Load Spreading

THE 106 working electricity sub-committees of the London and S.E. Regional Board for Industry consider they should remain in being to act in the event of an emergency, although there are to be no formal arrangements for national load spreading this winter. Consumers are warned that the strictest economy will still be necessary during peak hours and may, in the case of emergency, be asked at short notice to introduce load-spreading measures.

Last Year's Winners Repeat Successes in A.S.E.E. Contest

RESULTS of the W.E. Highfield Shield Competition for 1952-53, in which prizes are awarded annually for the best papers submitted by members on electrical subjects, have been announced by the A.S.E.E. It is significant that the winners of the first two awards in 1951-52 have repeated their successes. Mr. D. H. Taylor of New Barking won the first prize of 10 guineas with his paper on "Industrial Photoelectric Cells and Amplifiers," and Mr. C. A. Jones of Catford, S.E., the 5 guineas second prize for "Neon Signs—25 Years of Progress." Third award went to Mr. S. H. Harding of Ealing, for his paper on "Electrical Protection of 3-phase a.c. Motors." Presentation of prizes will take place at the Association's opening meeting of the London National Lecture Session on October 20.

NEWS IN BRIEF

Both the gallery and ground floor of Olympia are to be used for the eighth National Poultry Show which is to take place this year between December 10 and 12.

Atomic Energy Research Establishment at Harwell is to hold its seventh course on electronic instruments used in nuclear physics, radio-chemistry and work with radio-isotopes from September 28 to October 2.

Selling prices for tungsten ores of standard 65% grade and ordinary quality have been reduced as follows: Wolframite to 327s. 6d. and Scheelite to 312s. 6d. per long ton unit delivered consumers' works.

"Story of the E.T.U." is the title of a book recently published by the Union.

Institute of Personnel Management are to hold a five-day residential course on Employment and Welfare between September 6 and 11.

Batti-Wallahs next luncheon will be held on September 30 when Mr. Ted Leather will be the principal guest.

English Electric Co. have established a new research studentship in aeronautics, valued at £500 a year, at the Imperial College of Science and Technology.

British Insulated Callender's Cables, Ltd., have received an order for a 2,500 kVAr capacitor bank to be supplied to the Electricity Commission of New South Wales. It will comprise nine 250 kVAr single phase units, suitable for connection in star on 11 kV, 50 c/s, 3-phase system.

The 19th Annual Sports and Gala of Johnson & Phillips, Ltd., was held recently at the company's sports ground at Kidbrooke. The prizes were presented by Mrs. Wates, wife of Mr. G. Leslie Wates, J.P., chairman of the company.

Company Activities . . .

Cable and Wireless

An increase of £296,157 in the profit of this nationalised concern for the year ended March 31 last is shown in the annual report just issued. The profit figure is £1,777,806, and the directors are raising the dividend by ½% to 3%. In fact Major-General L. B. Nicholls expects a slightly higher profit for the current year. For the first time since 1947 there was a fall in the volume of traffic carried by the company's telegraphic system, the report points out. There was also a decrease in the total calls handled by the radio-telephone circuits. One of the company's main problems in its expansion of communications is that of financing of capital development. During the year over £800,000 of Government and other securities were sold, and since then it has been necessary to continue realisations. To enable the best arrangements to be made, the company obtained a loan from its bankers, it is stated.

Electrical Components Ltd.

Although the group profit, before taxation, for the year ended March 31 last, at £110,208, is £31,164 lower than the previous year, there is a final dividend of 12½%, again making a total of 20% for the year. The net profit is £49,375 (*£52,141*).

Electrical Switchgear and Associated Manufacturers, Ltd.

For the year ended March 31 last, the consolidated profit, after charging depreciation, amounts to £324,146. This compares with £272,386 for the previous year. But taxation absorbs £239,772 (*£165,615*) and the net profit is reduced to £84,374, as against £106,771 for the previous twelve months.

Hick, Hargreaves and Co.

The steady expansion of this concern is clearly shown in our accompanying table of results for the past five years. The careful dividend policy, clearly indicated in the table, and the ploughing back of profits, has been the means of putting the company into a sound and strong financial position, Mr. W. D. Madden, the chairman, states. Reserves have now reached a point where a further distribution of a scrip bonus could well be considered, and this is under consideration by the directors. Turnover during the year ended March 31 last was 20% higher than for the previous year. Contracts on the books exceed £5 million. Good progress has been made with extensions to the works and it is hoped to have the new erecting shop in production before the end of 1954.

Year to Mar 31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1949	260,706	95,034	72	10	49/3	38/9
1950	291,223	111,782	85	10	46/6	37/6
1951	347,949	129,970	86	15*	61/3	39/7
1952	369,567	135,096	89	20	66/-	51/6
1953	473,244	160,488	101	20	70/6	63/9

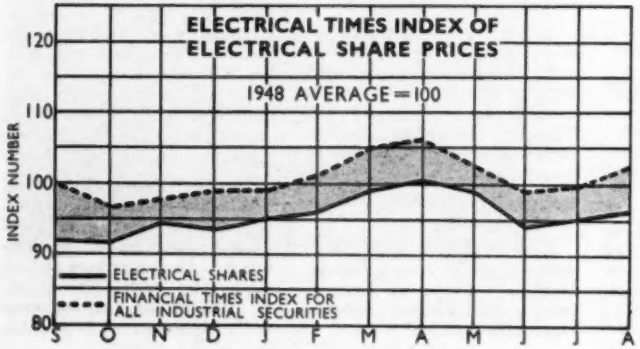
* Plus 20% capital bonus.

Oldham and Son, Ltd.

With one exception, the company's business has continued to expand during the year ended March 31 last. The exception is the car replacement battery market, where the trading conditions are regarded as a backwash of the Korean war by Mr. John Oldham, chairman of the company. He maintains that retailers built up

Year to Mar 31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1949	283,450	121,407	208	60*	5/9	4/-
1950	231,004	101,610	87	25	5/8	4/9
1951	302,786	110,048	98	30	5/6	4/-
1952	356,138	131,014	118	35†	3/4	1/9
1953	300,321	114,687	49	27½	2/10	2/3

* Plus 100% capital bonus
† Plus 100% capital bonus



While the index for all industrial shares rose markedly during July that for electrical shares remained at almost the same level. At the end of last month the Financial Times index for all industrial share prices had risen from 99·83 to 102·5. The Electrical Times index for all electrical share prices rose by 0·8 to 95·91 during July. Figures are based on the average prices prevailing in 1948

large stocks anticipating a shortage, but the reverse has been the case. At the same time the price of lead dropped sharply, while the export market was further reduced by currency restrictions. But he views the future with considerable confidence, bearing in mind the company's diversity of interests. Plans to extend the sale and manufacture of Fibrak battery separators throughout the world are proceeding. Considerable quantities have been sent to Australia.

Waite and Son, Ltd.

This lampshade manufacturing concern is not paying any dividend for the year to March 31 last. In the previous year the dividend was 10%. The period just completed resulted in a net loss of £15,813, against a profit of £9,880 previously. The directors state that the loss was mainly due to a heavy reduction in turnover, particularly in those groups showing highest profit margins. There were also technical difficulties with new materials which caused waste and delay, while the price levels were also reduced.

Dividend Declared

Falk Stadelmann and Co.—Interim of 10% (*same*).

Electric Supply News . . .

Aberdeenshire

A £30,000 scheme to supply electricity to the parish of Old Machar, Aberdeenshire, was inaugurated last week at a ceremony at the North of Scotland Hydro-Electric Board's substation in North Donside Road, Aberdeen. About 150 new consumers, most of them farmers and farm workers, will benefit by the scheme, which will be completed by the end of this month. The scheme involves some 27 miles of o.h. line. At the ceremony, the Marquis of Aberdeen and Temair, O.B.E., said the spread of electricity to farms was particularly welcome, for that county and Kincardineshire between them produce 33% of Scotland's agricultural output.

Denbighshire

The little village of Cyffilliog has its own electricity supply again. A small hydro-electric plant to utilise the Corris river as it passes through the village was established many years ago, but latterly the pipeline has been giving trouble under heavy water pressure. But now new cast iron pipes have been laid by a local firm and the plant has been overhauled.

Eire

Construction work has now been started on the peat-fired power station at Ferbane, Offaly, on the Silver River, for the Electricity Supply Board. The two generating sets to be installed are being manufactured in Switzerland and the boiler plant in Britain. Designed to generate 150 million units annually, it is expected to be in operation in 1956-57.

Merseyside and N. Wales

Two new standardised tariffs for farms are proposed by the Merseyside and North Wales Electricity Board. The first, for farms combined with the farmhouse, provides a primary block of 150 units per quarter, plus the appropriate domestic block for the farmhouse based on the assessable rooms, as per the standard domestic tariff. These units would be charged at 4½d. p.u., and all in excess at 1d. p.u. Where the aggregate rating of electrical appliances used in the farmhouse is in excess of 25 kW the primary block of units will be increased by 10 p.q. for each kW above 25 kW.

The second tariff applies to farms where there are no domestic premises or where the standard domestic tariff applies to the farmhouse. Here, the primary block will be 250 units p.q.at 4½d. p.u., and all in excess at 1d. Where the aggregate rating of the farm, including lighting, is over 25 kW, the primary block is increased by 10 units p.q. for each complete kW above 25 kW. The proposals are to be discussed at a meeting of the area consultative council on August 19.

Yorkshire

Surveys are now being made with a view to the erection of a second power station adjoining the present power station at Skelton Grange, Knostrop, Leeds, we gather. The existing station, planned for an ultimate capacity of 360 MW, went into operation in June 1951, and to date three 60 MW turbo-alternators have been installed. It is expected that this station will be completed by 1956. The projected second station will be adjacent to the present one and will be about the same size, it is stated.

LIGHTING SCHEMES

Bolton T.C.—Permission has been received to the borrowing of £10,080 for improved lighting in Withins Lane, Thicketford Road, the No. 10 bus route, Spa Road to Chorley New Road, Crescent Road and Fletcher Street (Derby Street to Bridgeman Street).

Doncaster.—The T.C. has approved a scheme for sodium lighting in parts of Carr House Road, Catherine Street, Printing Office Street, Priory Place and High Street.

Guildford T.C.—The Works Committee has recommended the approval of a scheme for the provision of 120 80 W mercury vapour lamps at a cost of £4,600, for completing the lighting at Ballfields.

Letchworth.—A three-year scheme for major street lighting improvements in the town, at an estimated cost of £5,000 a year, has been approved by the U.D.C.

Commercial Information

CONTRACTS OPEN

HOME

Aug. 14.—Manchester T.C. Supply of two 4 in. centrifugal pumps. City Surveyor, Town Hall, Manchester.

Aug. 15.—Aberdeen Harbour Commissioners. One year's supply of electrical fittings. Harbour Engineer, 15 Regent Quay, Aberdeen.

Aug. 15.—Cheadle and Gatley U.D.C. Electric light and power and emergency lighting at a prefabricated public hall at Adswood, Cheadle Hulme. Apply to Architects, F. Tomkinson and Sons, 180 Edleston Road, Crewe.

Aug. 15.—Selkirk T.C. Electrical work in 21 houses to be erected at Bannerfield site. Town Clerk, Municipal Buildings, Selkirk.

Aug. 15.—Stretford T.C. Supply of 60 steel poles, about 33 ft for street lighting. A. H. Perry, Borough Engineer, Town Hall.

Aug. 15.—Lanarkshire C.C. Supply of 12 lanterns, leak transformers and capacitors for 140 W sodium discharge lighting for Gretna-Stranraer-Glasgow-Stirling trunk road A80. Apply to County Lighting Engineer, 15 Clydesdale St., Hamilton, by above date.

Aug. 17.—Birmingham T.C. Replacement of passenger lift at the Rates Department Offices, 98 Edmund St. H. J. Manzoni, city engineer and surveyor, Civic Centre, Birmingham 3. Deposit £2 2s.

Aug. 17.—Cornwall. Electrical services in erection of new junior school at Alverton. Applications by above date to County Architect, S. Gregson, County Hall, Truro.

Aug. 17.—Liverpool T.C. Electrical installation at Clint Road, C.P. School. City Engineer and Surveyor, Municipal Buildings, Liverpool, 2.

Aug. 17.—Thingoe R.D.C. Wiring of pre-war houses at Pakenham, Ixworth, Badringham, and modifications to wiring at Fox Cottages, Stanningfield. S. M. Casson, Engineer and Surveyor, 1 Northgate Street, Bury St. Edmunds.

Aug. 18.—Bucks C.C. Firms desiring to be placed on list of sub-contractors and suppliers for (*a*) electrical installations and (*b*) electric light fittings, to apply to County Architect, County Offices, Aylesbury, by above date.

Aug. 19. — Newcastle-on-Tyne. Lighting, power and impulse clock installations at Stockfield Ave. school. R. W. Gregory and Partners, consulting engineers, Pilgrim House. Deposit £5 5s.

Aug. 20.—Chard T.C. Supply and installation of a street lighting scheme on county and district roads in the borough. Borough Surveyor, Municipal Offices, Chard, Somerset. Deposit £2 2s. (See July 23 issue.)

Aug. 20.—Darlington T.C. Provision and erection of electrically driven 500 g.p.m. vertical spindle sludge pump at Stressholme sewage disposal works. Borough Surveyor, Town Hall.

Aug. 21.—Sheffield T.C. Supply of electrical machines required for College of Technology. Documents from S. Moffett, director of education, Education Office, Sheffield.

Aug. 21.—Lancashire. Electrical installations in police houses in North, West and East Lancs. Applications, specifying area, to County Architect, County Hall, Preston, by above date.

Aug. 22.—Hawick T.C. Electrical installation in erection of 23 houses at Burnfoot. J. A. W. Grant, chart. archs., 36 Melvill St., Edinburgh.

Aug. 22.—Sedgley U.D.C. Supply of units to convert 36 existing gas columns to electricity with 80 W mercury vapour lighting, including all necessary gear, and erect the columns on four roads. W. M. Jones, engineer and surveyor, The Limes, Dudley Rd., Sedgley.

Aug. 22.—South Liverpool Hospital Management Committee. Electric light and power wiring, and installation of Pillotone points in Ward 20 at Sefton General Hospital. G. Chaplin, secretary to the committee, Sefton General Hospital, Liverpool 15.

Aug. 24.—Esher U.D.C. Installation of electrical wiring and fittings at sewage works. Engineer and Surveyor, Council Offices. Deposit £1 1s.

Aug. 24. — Cheltenham T.C. Supply and erection of sodium street lighting equipment in Group A—including lanterns, lighting equipment, steel columns—for Bath-Lincoln trunk road. C. Gould Marsland, Borough Engineer, Municipal Offices. Deposit £3 3s. (See July 16 issue.)

Aug. 24. — Manchester T.C. Supply of 62 trolley bus chassis complete with all electrical equipment. General Manager, Corporation Transport Dept., 55 Piccadilly, Manchester.

Aug. 24.—Manchester T.C. Renewal of electrical installation in three houses on Langho Colony, nr. Blackburn. City Architect, Town Hall. Deposit £1 1s. (See Aug. 6 issue.)

Aug. 24.—Southgate B.C. (*a*) Supply only of lanterns and control gear for 115 140 W sodium vapour discharge lamps; (*b*) supply and erection of 115 concrete lamp columns, lanterns, wiring, control gear, etc. Borough Engineer and Surveyor, Town Hall, Palmers Green, N.13. (See July 23 issue.)

Aug. 24.—Sutton and Cheam U.D.C. Erection of 112 25-ft reinforced concrete columns with provision and fitting of G.E.C. lanterns and auxiliary equipment for 140 W sodium lighting on about 2·45 miles of road. N. H. Mitchell, borough engineer and surveyor, Municipal Offices, High St., Sutton, Surrey. Deposit £1 1s.

Aug. 26.—Baildon U.D.C. Supply, erection, etc., of 42 250 W MV lanterns on concrete columns in Baildon Rd. and Browgate. Surveyor, Town Hall.

Aug. 28.—Belfast. Supply, erection, etc., of 33/6·6 kV, 10,000 kVA, outdoor step-down transformer, with tap-change equipment. (Tender No. 1299). Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See July 16 issue.)

Aug. 28.—Belfast T.C. Supply and erection of electric hoist-blocks for Municipal Electric Power Station East. Documents from Electricity Dept., East

Bridge St., Belfast. Deposit £1 1s. (See Aug. 6 issue.)

Aug. 29.—Basingstoke (Hants). Supply of electric lamps during six months beginning Oct. 1 for Park Prewett Group Hospital Management Committee No. 47. Secretary is Fredk. Hales.

Aug. 29. — Cowdenbeath T.C. Improved lighting scheme on trunk road A90 between the burgh boundary at Perth Road and the boundary at Broad St. Burgh Surveyor, Town House, Cowdenbeath.

Aug. 31.—Salford T.C. Electrical installation at Blackfriars public baths. General Superintendent, Admin. Offices, Blackfriars Public Baths. Deposit £1 1s. (See July 23 issue.)

Aug. 31.—Southgate B.C. Supply and erection at refuse disposal works, Barrowell Green, N.21, of an over-band type magnetic separator for use in conjunction with existing drum-type magnetic separator. Tender to include wiring and switchgear. J. T. W. Peat, Borough Engineer and Surveyor, Southgate Town Hall, Palmers Green, N.13.

Aug. 31. — Thurrock U.D.C. Manufacture and installation of 3 axial-flow pumps, electrically driven and complete with switchgear, starters, travelling overhead crane, etc., for Marsh Farm Sewage works. W. H. Radford and Son, consulting engineers, Albion Chambers, King St., Nottingham.

Sept. 1.—Liverpool T.C. Installation of automatic telephone and fire alarm system at Cottage Homes, Fazakerley. City Engineer and Surveyor, Municipal Buildings (See Aug. 6 issue.)

Sept. 2. — Newcastle-on-Tyne T.C. Electrical and heating installations in erection of 1,284 flats on Longbenton estate. City Architect, 18 Cloth Market.

Sept. 7.—Cannock U.D.C. Supply, erection and installation of 66 140 W sodium and seven 3 x 80 W fluorescent lighting columns on Cannock Road, Blackfords-Cannock Road, Hednesford, B.5013. E. Lomax, Engineer and Surveyor, Council House, Cannock, Staffs. Deposit £2 2s.

Sept. 7.—Long Eaton U.D.C. Supply only of 30 sodium and 21 fluorescent lamps and equipment; and supply and erection of 43 concrete and four steel columns and fixing of lighting equipment for Class A street lighting along Nottingham Rd. and Market Place. F. Turner, Engineer and Surveyor, Town Hall.

Sept. 7.—Preston T.C. Total rewiring of the lighting, heating and power circuits at the main Corporation Storeyard, Argyll Road. Total capacity of installation will be approximately 250 kW. Borough Engineer and Surveyor, Municipal Building, Preston. Deposit £2 2s. (See Aug. 6 issue.)

Sept. 8.—Louth T.C. Supply and erection of two electrically operated booster pumps and three electrically operated borehole pumps with auxiliary equipment. J. H. Haiste and Partners, 4 Queen Sq., Woodhouse Lane, Leeds 2. Deposit £2 2s.

OVERSEAS

Details of items marked • may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.

Sept. 1.—Australia. State Electricity Trust of S. Australia invite tenders for supply of two 11,000/430 V 1,000 kVA Delta/Star 3-phase transformers. Trust is at North Terrace, Adelaide, P.O. Box 412 C. Adelaide. B.o.T. (Ref: ESB 846/53)•

Sept. 3.—Uruguay. Supply of control apparatus and electric units for 110 kV substations under tender no. 389/253. Usinas Electricas y los Telefonos del Estado. B.o.T. (Ref: ESB 873/53)•

Nov. 2.—South Africa. Municipality of Salisbury requires supply and erection of 33 kV and lower voltage switchgear and accessories for power station No. 3. Documents available from Merz and McLellan, Carliol House, Newcastle-on-Tyne, after fees (£21 for four copies) have been paid at Salisbury Electricity Dept. Offices, Wynne St., Salisbury. B.o.T. (Ref.: ESB 00084/53)•.

Nov. 3.—Brazil. Supply of various mechanical and electrical apparatus, including transformer equipment for Jacui Hydro-Electric power station at Potreirinho do Salto. Commissao Estadual de Energia Electrica. B.o.T. (Ref.: ESB 205/53)•.

Dec. 1.—New Zealand. Supply of 466 steel transmission towers for Tuai-Gisborne 110 kV line required by State Hydro-Electric Dept., Wellington. Deposit required is £100 and bond £4,500. Copies of specifications available at N.Z. Govt. offices in London

Your Queries — Answered

"Horvell" paint strippers, makers of? L.E.—Maurice Cheshire and Co., 29 Soho Hill, Birmingham, 19. (23482)

"Omega" headphones, suppliers of? I.P.—Kenroy Ltd. 152 Upper St., N.1. (23489)

"Embee" coffee percolators, makers of? T.B.—F. and F. Electric Fittings Ltd., 33 Alfred Place, W.C.1. (23497)

Domestic refrigerator, with an oak finish shown at the Ideal Homes Exhibition, makers of? B.C.—We presume this enquiry refers to product of: Insulations & Constructions Ltd., St. Johns Works, Tylers Green, Bucks (23509)

Sanitary incinerators, makers of? A.P.—Saniguard Appliances Ltd., 62 London Wall, E.C.2; General Electric Co. Ltd., Magnet House, Kingsway, W.C.2; Jackson Electric Stove Co., Ltd., 143 Sloane St., S.W.1; Euk Catering Machinery Ltd., 6 Avonmore Rd., W.14; Hygienette Mfg. Co., 39 Victoria St., S.W.1. (23520)

"B.E.C." condensers, makers of? T.E.—British Electrolytic Condenser Co., Ltd., 52 Vicarage Lane, Ilford. (23531)

"Jacobs" chucks, makers of? L.B.—Jacobs Mfg. Co., Ltd., Archer Tool Works, Sheffield; also supplied by H. and D. Churchill Ltd., Walnut Tree Walk, S.E.11. (23546)

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS PLACED

Barnstaple T.C. Improvements to lighting in Braunton Rd. and Rolle St., Revo Electric Co. Ltd., £1,494.

B.E.A. Two 240,000 lb/hr boilers at Acton Lane B, Mitchell Engineering, Ltd.; one 550,000 lb/hr boiler at Marchwood, John Thompson Water Tube Boilers, Ltd.; two 30,000 kW turbo-generators and feed heating plants at East Yelland, C. A. Parsons and Co., Ltd.; three 60,000 kW turbo-generators, condensing and feed heating plants at Tilbury, C. A. Parsons and Co., Ltd.; 275 kV switchgear at Castle Donington, British Thomson-Houston Co., Ltd.; two 300,000 lb/hr boilers and ancillary equipment at Nottingham, Mitchell Engineering, Ltd.; high-pressure steam feed pipework and valves at Wakefield, Aiton and Co., Ltd.; two 60,000 kW turbo-generators, condensing and feed heating plants at Stella North, C. A. Parsons and Co., Ltd.; one cooling tower at Huncoat, Film Cooling Towers (1925), Ltd.; pipework, valves, steam receivers and tanks at Clyde's Mill, Stewarts and Lloyds, Ltd.; 132 kV isolators and connections at Hartley substation, English Electric Co., Ltd.; 90 MVA 132/33 kV transformers at Harrow substation, English Electric Co., Ltd.; 132 kV, 22 kV and auxiliary cables at Woolwich-Eltham, W. T. Glover and Co., Ltd.; 132 kV double-circuit line between Andover and Thatcham, Pirelli-General Cable Works, Ltd.; 132 kV overhead line at Lancaster-Quernmore, British Insulated Callender's Construction Co., Ltd., and 132 kV cables from Clyde's Mill to Cambusland, Pirelli-General Cable Works, Ltd.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	230-232½	—
,, (3 months)	210-212	—
LEAD, good soft pig (foreign)	95½-96	112 0 0
TIN (99·93·76%) ... ...(Cash)	583½-584	—
,, (3 months)	581-582	—
ALUMINIUM, commercial purity (del.)	150 0 0	—
ZINC	73½-74	86-92
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	50 10 0	—
Mild Steel Tape (0·04 in.)	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Electrical and Radio Installations Co. (Surrey) Ltd. Resolution for voluntary winding-up passed at meeting on July 30, when G. A. Burton, 14 Stonebridge Court, Stonebridge Park N.W.10, was appointed liquidator.

Electrical Power Installations (S. Wales) Ltd. Meeting of members and creditors will be held at Poppleton and Appleby's offices, 35 Windsor Place, Cardiff, on Sept. 9 at 12 noon and 12.30 p.m. resp., to receive liquidator's report.

Franklin and Freeman (London), Ltd. Petition for purchase of shares or winding-up presented and directed to be heard at Royal Courts of Justice on October 5. Interested persons should communicate with Manser, Phillips and Co., 20 High Holborn, W.C.1, by October 3.

Refrigeration Specialists, Ltd. Meeting of creditors and contributories will be held at St. Mary's Chambers, Derby, on August 31 at 10 a.m., to receive liquidators' report.

Ranelagh Radio and Electrical Co., Ltd. Meeting of members will take place at A. E. Attwood and Co., 20-21 Lawrence Lane, Cheapside, E.C.2, on September 9 at 11 a.m., to receive liquidator's report.

The Fordham Electrical Engineering Co., Ltd. Liquidator, John M. Clarke, Sr. Official Receiver, of Inveresk House, 346 Strand, W.C.2, released as from July 15.

Maida Vale Electric Co., Ltd. John M. Clarke, Sr. Official Receiver of 346 Strand, W.C.2, liquidator, released as from July 15.

BANKRUPTCY ACTS

Intended Dividends

Manchester. Frank L. Napier, electrical contractor trading at 5 School Rd., Sale. Last day for receiving proofs, August 19. Trustee is G. H. Eaves, 47 Mosley St., Manchester.

Derby. Hector W. Sharp, electrical and radio engineer of 178 Osmaston Rd., Derby, trading as Willdays. Last day for receiving proofs, August 17. Trustee is A. W. Hunter, Latham and Co., Walter House, 418-22 Strand, W.C.2.

Appointment of Trustee

Blackburn. Frank Lockett, electrician trading at 10 Blackburn Rd., Great Harwood. Trustee is R. C. Baldwin, C.A., Richmond Terrace, Blackburn.

Dividends

Lincoln. John L. Parker, electrician, trading at 15 West St., Horncastle. Second and final dividends of 1s. 0½d. in £ payable on August 15 at Official Receiver's Office, 22 Regent St., Park Row, Nottingham.

Release of Trustee

Southend. Arthur Jacobs, trading as electrical engineer at 312 London Rd., Westcliff-on-Sea. Trustee was W. J. Wallis Hill, Official Receiver, 3 Central Buildings, Matthew Parker St., Westminster.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller

Monitrol. 710,092. Class 9. Thermostats, thermostatic valves, thermo-electric control valves, electrically operated ignition systems for use with fluid fuel burners, etc. Monitor Eng. and Oil Appliances Ltd., Monitor Works, Flaxley Rd., Birmingham 9.

Raydair. 715,604. Class 11. Electric radiators and convection heaters. Berry's Electric Ltd., 85/86 Newman St., London W.1.

Trustacord. 717,658 and **Sonocord.** 717,659. Class 9. Apparatus and instruments for recording and reproducing sound, wireless sets, etc. Trust Accessories Ltd., Excelsior Works, Hulme Hull Rd., Manchester 15.

Ventical. 714,595. Class 9. Electrical apparatus and instruments and wireless sets. Volex Electrical Products Ltd., 37 Brown St., Manchester 2.

Vesta. 714,220. Class 11. Electric pressure cookers. Easiwork Ltd., 29 Goodge St., W.1.

BUSINESS PROSPECTS

Aberystwyth T.C. Construction of 86 houses on Pen-y-Bont (West) site. Borough Surveyor, Park Avenue.

Bedwellty U.D.C. Tenders invited for site works for proposed erection of 54 houses in Pengham Rd., Aberbargoed. Engineer and Surveyor to Council, Municipal Offices, Aberbargoed.

Bootle T.C. Application to be made to borrow £41,238 for infants' dept. at Netherton Moss primary school.

Borehamwood. It is proposed to erect infants' school at Cowley Hill at estimated cost of £44,261.

Boston (Lincs). Extension to Kitwood Girls' School estimated to cost £16,640.

Brighton T.C. Erection of 62 dwellings on Craven Vale estate. Borough Engineer and Surveyor. Also construction of factory in Lr. Bevendean Light Industrial area. D. J. Howe, borough engineer and surveyor, 26-30 King's Road.

Bristol. Tucker Bros. (Designs) Ltd. propose to erect a factory in Barton Vale.

Corby. Some local traders are planning to build 3-storey block of 10 shops and maisonettes to replace their existing nissen huts. Plans by Gotch Saunders and Surridge, of Kettering.

Cumberland. Work is to begin next year on £102,000 secondary modern school at Penrith.

Dagenham. Ministry of Works are planning to build telephone exchange on Heathway site.

Darlington. Four shops to be built on both the Haughton and Nickstream estates. Flats will be built above.

Doncaster. Sheffield Regional Hospital Board is planning extensions to St. Catherine's Institution.

Durham. Co. Education Committee has been recommended to install electric lighting in Jarrow Ellison Street C. of E. school. R.D.C. seeking loan sanction for £55,900 being sought for erection of 52 houses at Bearpark.

Dumbartonshire. F. J. Beveridge and Dallachy, 248 West George St., Glasgow, are architects for extensions etc. to Bull's Metal and Marine Ltd.'s Bulldale St. premises.

Ealing (Middx) T.C. It is planned to build 48 old people's dwellings and further 36 flats on Northolt Park estate.

Eccles (Lancs) T.C. Scheme in hand for re-development of Barlow St.-Cawdor St. area, providing for erection of 346 houses and block of shops.

Falkirk. Dean of Guild Court has approved plans for extending book-binding factory in Kerse Lane for Dunn and Wilson Ltd.

Forfar. Scottish Home Dept. has approved £32,320 scheme for reconstruction of Reid Hall.

Gateshead. Cackett, Burns Dick and McKellar, 21 Ellison Place, Newcastle, are architects for Fusarc Ltd.'s proposed new factory.

Glasgow. British Polar Engines, Ltd., Helen St., S.W.1, are to build a one-storey extension to their premises; and plans have been submitted by Arc Manufacturing Co., Ltd., for laboratory building at their Actarc works.

Glastonbury T.C. Further 130 houses are being planned for Windmill Hill site.

Greenock. Lahora and Fergison, Ltd., are to build a factory in Upper Islington St. Plans by Frank Burnet, Boston and Bell, 180 Hope St., Glasgow.

Halesowen (Worcs) T.C. Amended plan prepared for 348 houses on Furnace Park estate.

Hull T.C. Construction of 223 dwellings on Longhill estate. City Architect's Dept., Guildhall.

Ilkeston (Notts) T.C. Application to be made to borrow £32,100 for erection of seven shops and maisonettes on Kirk Hallam estate.

N. Ireland. Construction of 157 dwellings at Andersonstown for N.I. Housing Trust. Trust is at 12 Hope St., Belfast.

Islington B.C. Erection of a five-storey and two four-storey blocks of flats comprising 57 dwellings in Whadcoat St. Town Clerk, Islington Town Hall, Upper St., N.1.

Lanarkshire. Scottish Industrial Estates, Ltd., Woodlands Rd., Glasgow, are to erect factory on Narston industrial estate.

Lancashire. Approval given to erection of first phase of Rossendale Education Committee's new premises at College for Further Education at Waterfoot. Estimated cost, £46,137.

Ledbury R.D.C. Construction of 27 houses and 16 flats in Colwall scheme. Council's Architects, Pemberton and Bateman, 21 Vine St., Evesham.

Leicestershire. Home for aged and infirm costing £47,000 is to be built at Earl Shilton, and a £14,100 workshop at Hinckley College of Further Education.

Litherland U.D.C. Erection of 68 houses on Field Lane estate. Surveyor, Town Hall.

Lytham St. Annes T.C. Smithy Lane site is to be developed by erection of about 200 houses over next three years.

Manchester. Schemes in hand for erection of shops and dwellings on two sections of Langley estate, Middleton. Total cost estimated at £67,040. Also it is proposed to build 36 flats at Wythenshawe and 54 dwellings at Blackley.

Mansfield (Notts) T.C. Following building plans are being considered: 10 bungalows in Ward Place; 66 dwellings in Ladybrook Lane; 100 dwellings off Beck Cres.; and 6 houses off Ruskin Rd.

Middlesbrough. Revised sketch plans in hand for first stage of Longlands County College.

Middlesbrough T.C. Ninety-six houses are to be built at Park End.

Newcastle-on-Tyne. Factory additions proposed by Cremona Toffee Works.

Newcastle-under-Lyme T.C. It is proposed to build 252 houses at Knulton Village.

Northampton T.C. It is proposed to build 151 houses at Eastfield and 44 old persons' homes in three roads.

Northumberland. Preliminary plans approved for grammar school at Kellingworth. Cost will be £137,850.

Peterlee. Development Corpn. erecting 93 flats at Chapel Hill. A. V. Williams, general manager, Sholton Hall, Castle Eden, Co. Durham.

Tottenham B.C. Erection of 32 dwellings on Markfield estate. Borough Engineer, Town Hall, N.15.

Wetherby R.D.C. Erection of total of 48 houses on six sites. Council's Architect, Needham, Thorp and White, 6 High Petergate, York.

Whitby. Site being sought by Town Tailors, Ltd., of Leeds, for erection of factory.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Alex Owen Ltd., 161 High Rd., Chilwell, Notts. To take over business of wireless, television, electrical, motor and refrigeration engineer carried on at Chilwell by Alexr. Owen. Cap.: £3,000. Dirs.: A. Owen and Mrs. M. Owen.

G. Applegate and Sons Ltd., 1 Upper Broad St., Trowbridge, Wilts. Heating and ventilating, gas, oil, fuel and electrical engineers, etc. Cap.: £10,000. Dirs.: G. Applegate and J. Applegate.

K.M. Chalmers Ltd., Commerce House, 6/8 Blagrave St., Reading. Designers, manufacturers, distributors, wholesalers and retailers of machinery, electrical equipment, instruments and tools; ironfounders, etc. Cap.: £1,000. Dirs.: Kathleen M. Chalmers and W. B. B. Chalmers.

Firesnow Ltd., Withyfold Drive, Hurdsfield, Macclesfield. Fire, mining, hydraulic, mechanical, electrical and chemical engineers, etc. Cap.: £100. Dirs.: C. Morris and Mrs. L. Morris.

H.J.S. Industrial Instruments Ltd. Manufacturers of and dealers in gauges and any other instruments for measurement and control of pressure, liquid levels, etc. Cap.: £500. Dirs.: H. J. Smith, and Mrs. H. F. Smith, 1663 Coventry Rd., South Yardley, Birmingham.

Plessey (Northern Ireland) Ltd. Electricians, electrical and electronic engineers, etc. Cap.: £10,000. Dirs.: E. H. Ouston, 20 The Dell, Woodford Wells, Essex, and M. T. Slater, Elm Lodge, West Weybridge, Surrey.

J. A. Taylor (Refrigeration) Ltd., 15 Cornwall Place, Marton, Blackpool. Manufacturers of and dealers in refrigerators, etc. Cap.: £30,000. Dirs.: J. A. Taylor, M. A. Toomey, J. H. P. Dalton and A. J. Day.

Technical Ceramics Ltd. Manufacturers of and dealers in ceramics, technical porcelain, electrical insulating material, etc. Cap.: £100. Dirs.: to be appointed by subs. Subs.: L. J. Huggett, Orme Lea, 54 Chart Lane, Reigate; J. J. Spreyer, Wentways, The Rise, Sevenoaks.

Transacord Ltd., 2/3 Warwick Court, Holborn, W.C.1. Recorders of sound, manufacturers of and dealers in sound recordings, etc. Nom. cap.: £500. Dirs.: P. T. Handford, Freda Handford, and D. T. Thorne.

Trevor-Johnstone (Manufacturing) Ltd., 19 Gt. Winchester St., E.C.2. Manufacturers of general electronic and electromechanical equipment and sound recording and communications developments; to manufacture all products marketed by the Trevor-Johnstone Co., Ltd., etc. Cap.: £1,000. Dirs.: K. L. Komendowski and Joan W. Trevor-Johnstone.

W.S. Electronics Production Ltd., 203 Regent St., W.1. Cap.: £10,000. Dirs.: G. C. Wheeler and A. Simpson.

Victory Industries (Sales) Ltd. Manufacturers of and dealers in builders' and domestic hardware, ironmongery, electrical fittings, etc. Cap.: £120. Dirs.: Not named. Subs.: J. R. Dupree, Lowood, Sunninghill, Ascot, and W. J. Warren, Old Victory Cottage, Hogsback, Seal, Surrey.

MEETINGS TO NOTE

TUESDAY, SEPT. 1

INCORP. PLANT ENGRS. (Edinburgh). "Factories Act" '37 and '48, affecting Plants Engineers." Miss G. M. Mitchell, 25 Charlotte St., 7 p.m.

INCORP. PLANT ENGRS. (London Branch).—"Factories Act requirements affecting the Plant Engineer." H. Eccles. Royal Society of Arts, John Adam St., Adelphi, 7 p.m.

WEDNESDAY, SEPT. 2

INCORP. PLANT ENGRS. (Southampton). "Approach to Maintenance—Specialist Team's Visit to U.S." Colin Troup. Polygon Hotel, 7.30 p.m.

FRIDAY, SEPT. 4

SOUTHAMPTON ELECTRIC CLUB. Meeting at Polygon Hotel, 7 p.m.

EXHIBITION DIARY

Radio and Television. 20th Show at Earls Court opens on Sept. 1 and closes on Sept. 12.

Engineering, Marine and Welding. 19th Show opens at Olympia on Sept. 3 and continues until Sept. 17.

Electro Medical. This exhibition and the first International Congress of Physical Therapy opens at Central Hall, Westminster, on Sept. 7. It closes on Sept. 11.

TRADE NOTES

Changes of Address.—The head office of the Cheshire Engineering Co. Ltd., is now at 19 Berkeley Street, London, W.1. Telephone, Hyde Park 9231.

Pictorial Machinery (Engineers) Ltd., have moved their offices and works to Lithotex Works, Kelvin Way, Manor Royal, Crawley, Sussex. Telephone Crawley 1520.

Mr. H. G. Towner, area manager for Venner Ltd., has moved to Court Cottage, Tithe Pit Shaw Lane, Warlingham, Surrey. Telephone: Upper Warlingham 2519.

Portuguese Imports. The completed list of goods, the import of which is permitted under the liberalisation measures, includes accumulators, batteries, electric washing machines, dish washers, meters, generators, lamps, transformers and 3-phase synchronous motors. It is stressed that for most goods imported into Metropolitan Portugal, an import licence is required.

Nyasaland Duties. The Nyasaland customs tariff duty on various electrical equipment has been amended on batteries and accumulators: the duty is now 12½% ad valorem; on flexible cords, v.i.r. and plastic cables, switched lampholders, bells and buzzers, domestic appliances, hedge cutters, lawn-mowers, torches, and stoves it is 25%; and on discharge lighting installations, including signs, 10%; For ordinary lampholders and wire for installation and transmission purposes (other than flexibles) there is no duty.

Factory Move. Hayward-Tyler and Co. Ltd., have announced that they propose to transfer their Portobello branch to a new factory at East Kilbride in about a year's time. The factory manufactures small steam turbines, pumps, etc.

Sales Reorganisation. Wilkins and Mitchell Ltd., announce the splitting of the "Servis" electric washing machine and refrigerator sales organisation in London and the Home Counties. Henceforth two divisions will handle all products, London (North) sales division and London (South) sales division, with Mr. L. R. Hall as commercial manager for both divisions located at 1 Craven Park, Harlesden, London, N.W.10. Mr. A Knowlden becomes London (South) divisional sales manager and Mr. D. Thornton divisional publicity representative, with offices at 790A London Road, Thornton Heath, Surrey.

a good length at the Oval!

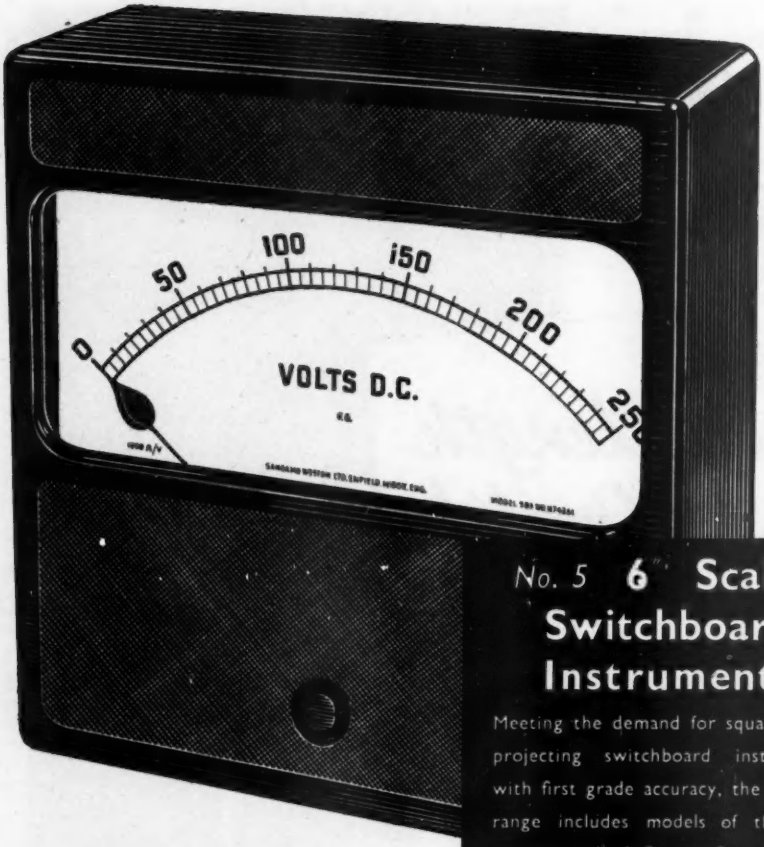
The world-famous Oval gasholder provides a topical background to some good field work by HENLEYS. The photograph shows a length of Henley cable going in—one of four HENLEY 33 kV circuits plus pilot cables of a reinforcement scheme for the London Electricity Board's main network. The route runs from Bengeworth Road, Loughborough Junction, S.E. to the site for a new substation adjacent to the Oval cricket ground.

HENLEY CABLES

well made... well laid

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
51-53 Hatton Garden, London, E.C.1



No. 5 6" Scale Switchboard Instruments

Meeting the demand for square cased projecting switchboard instruments with first grade accuracy, the Weston range includes models of the D.C. moving coil, A.C. rectifier and H.F. thermocouple types, as well as the moving iron type. The model S.83 illustrated, is fitted with a 6" scale and pear shaped pointer for ease of reading. Send for details of Weston switchboard instruments. The full Weston range includes panel, switchboard, portable, sub-standard and laboratory standard instruments.

WESTON

Electrical Measuring Instruments

SANGAMO WESTON LIMITED

Enfield, Middlesex. Tel: Enfield 3434 (6 lines) & 1242 (4 lines). Grams: Sanwest, Enfield

London, Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton, Brighton

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF
FIRST ASSISTANT DISTRICT ENGINEER
Rossendale District

THE PERSON appointed will be required to assist and deputise for the District Engineer in the control, construction, operation and maintenance of sub-stations and the distribution system in the District, including the preparation of schemes and estimates for system extensions. Applicants should have had a wide experience on supply systems, preferably up to and including 33 kV.

Preference will be given to applicants who are Corporate Members of the Institution of Electrical Engineers.

Salary scale: £833 to £834 p.a. Grade "E.4." N.J.B. conditions.

Applications to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee Street, Blackburn, by August 22, 1953.

APPOINTMENT OF
(a) METER TESTERS
(b) METER REPAIRERS (MECHANICIANS)
Testing Station, Preston

Wages and conditions: N.J.I.C. Present rate 4s.00d. per hour, 44-hour, five-day week.

Applications, stating age, training and experience, to the Manager, No. 4 Sub-Area, The North Western Electricity Board, 40-41 Lune Street, Preston, by August 22, 1953. (E 563)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 62/53.

APPLICATIONS invited for N.J.B. superannuable appointments of JUNIOR ENGINEERS at Uskmouth Power Station, nr. Newport. Salary "K19/15", £402 to £545 p.a.

H.N.C. and manufacturing works training essential.

Required for training in modern power station operation and maintenance.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Road, Gabalfa, Cardiff, should be returned by August 28, 1953.

August 7, 1953. (E 590)

MIDLANDS ELECTRICITY BOARD

GENERAL ASSISTANT DISTRICT ENGINEER required in the Stroud District of the Central Gloucestershire Sub-Area. Experience necessary in all branches of distribution work including operation and maintenance of high and low-voltage cables and overhead lines, substations, etc. Technical qualifications desirable. Salary £531 to £547 per annum. (N.J.B. Grade D.10.) Superannuable.

Apply within 14 days, stating age, experience, present salary and position, and quoting Ref.: Glos/T.172 to Sub-Area Manager, Midlands Electricity Board, 128 London Road, Gloucester.

A. STEPHENS,
Secretary.
(E 591)

COUNTY OF LINCOLN—PARTS OF KESTEVEN

Education Committee

GRANTHAM TECHNICAL COLLEGE

Principal: G. F. Johnson, M.Ed., B.Sc., M.I.Mech.E., A.M.I.Mar.E., F.R.S.A.

APPLICATIONS are invited for appointment to a new full-time post in the ENGINEERING DEPARTMENT Candidates should hold some recognised qualification, such as Higher National Certificate in Electrical Engineering or City and Guilds Certificates in Electrical Engineering Practice or Electrical Installation Work. Practical experience in electrical supply, distribution or contracting is essential. Candidates should be able to offer Electrical Installation and Electro-Technology as main subjects.

The post is available from September 1, 1953, and the salary offered is Burnham Scale, Grade "A."

Application forms and further particulars may be obtained by sending a stamped addressed envelope to the Principal. Completed forms should be returned, as soon as possible, to the Principal, The Technical College, Avenue Road, Grantham, Lincs.

T. W. P. GOLBY,
Director of Education.

County Offices,
Sleaford, Lincs. (E 572)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

JUNIOR ENGINEER
Little Barford Generating Station

Salary Class "G," Grade 16, £402; Grade 14, £491 per annum.

Commencing salary depending on qualifications and experience.

The duties of the successful applicant will include assisting in the control room on shift and other operation and investigation duties. Preference will be given to applicants who have had previous experience in a generating station and who have reached the standard of the Ordinary National Certificate in Electrical Engineering or its equivalent.

Applications, stating age, qualifications and experience, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by August 22, 1953.

W. N. C. CLINCH,
Controller.
(E 560)

EASTERN ELECTRICITY BOARD

Northmet Sub-Area

THIRD ASSISTANT ENGINEER (59/53.N.)
Hornsey District

CANDIDATES should have had a sound technical training and experience in the construction, operation and maintenance of h.v. and l.v. underground systems.

The salary for the appointment will be in accordance with Class "F," Grade 9 of the National Joint Board Salary Agreement, commencing at £607 per annum plus London allowance. Both future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications by letter, stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted to the District Manager, Hornsey, Eastern Electricity Board, The Broadway, Crouch End, London N.8, within 14 days of the appearance of this advertisement. (E 573)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division:—

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department Vacancy No. 22/53

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department. Vacancy No. 44/53.

Senior Draughtsmen are required in the mechanical section of the Construction Department at North Wilford Power Station. Candidates should have experience in one or more of the following:—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
(ii) H.p. and l.p. steam and feed pipework. Condensing plant and feed heating systems.
(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement, Grade 5 (£567 to £671 per annum) and Grade 6 (£433 to £567 per annum) of Schedule "D," according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53.

Candidates should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ASSISTANT SHIFT CHARGE ENGINEER
(BOILER HOUSE)

Longford Power Station, Coventry. Vacancy No. 79/53.

Applications are invited from suitably qualified engineers to take charge of shift operation of boiler house plant. Applicants must possess a sound technical training, have had good general engineering experience, a knowledge of the control and operation of large water tube boilers, ancillary plant and in the efficient combustion of fuels on chain grate stokers.

The salary will be in accordance with Schedule "A," Class "G," Grade 9 (£641 to £667 per annum) of the National Joint Board Agreement.

Closing date for this appointment will be August 20, 1953.

SHIFT CONTROL ENGINEER
Spondon Power Station. Vacancy No. 80/53.

Candidates should have a sound engineering training and practical experience in a modern power station. The possession of a Higher National Certificate or its equivalent would be advantageous.

The salary will be in accordance with Schedule "A," Class "H," Grade 10 (£641 to £667 per annum) of the National Joint Board Agreement.

Closing date for this appointment will be August 20, 1953.

The above appointments will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(E 573)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

THIRD ASSISTANT ENGINEER (TECHNICAL) required to be based on Legacy, near Wrexham. Salary £680 to £706 per annum (N.J.B. Class "J," Grade 10).

Applicants should possess the Higher National Certificate in Electrical Engineering or equivalent qualification and should have had practical experience in the use of electrical standardizing apparatus and the checking of substandard equipment as installed in a Type "A" single-phase testing station, including the testing and calibration of all types of a.c. meters and instruments.

Experience in the administrative work of a meter-testing station and in the supervision of meter testers and repairers will be an advantage.

The appointment is superannuable and subject to medical examination.

Application forms obtainable from the Manager, No. 4/5 Sub Area, Electricity House, Rhostyllen, near Wrexham. Closing date, August 24, 1953. (E 561)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

APPLICATIONS are invited for appointment as SENIOR ASSISTANT ENGINEER (TECHNICAL) in the Chief Engineer's Department.

Applicants should preferably possess a degree in electrical engineering or be Corporate Members of the Institution of Electrical Engineers. They should have experience with distribution plant and equipment at all voltages up to 33 kV and a good practical and theoretical knowledge of metering, protective gear, telephone and supervisory equipment, with a specialist knowledge of one or more of these subjects. The salary for the appointment will be on Grade 1, Class AX/CX of the National Joint Board Agreement, i.e. £970 to £1,166 per annum.

The appointment is superannuable and the successful applicant may be subject to medical examination. Forms of application may be obtained from the applicant's appropriate officer or from the undersigned, and should be submitted to the undersigned not later than August 31, 1953. Persons who recently submitted an application for an appointment with the Board need only indicate that they wish to be considered for this vacancy.

J. MEEK,
Secretary.
62 Dalziel Drive,
Glasgow, S.1.
August 5, 1953. (E 575)

BRITISH ELECTRICITY AUTHORITY

South West Scotland Division

ASSISTANT MAINTENANCE ENGINEERS (ELECT.)
Kilmarnock and Yoker Generating Stations.

APPLICATIONS are invited for the positions of Assistant Maintenance Engineers (Elect.) at Kilmarnock and Yoker Generating Stations. Applicants should have received a good technical education and have extensive experience of electrical equipment and maintenance in generating stations. The salary will be in accordance with Grade 8 of the National Joint Board Agreement, Class "F" with a salary of £635 per annum, rising to £664 per annum.

Applications on Form AE6 which may be obtained from the above address or from any Divisional Office of the Authority should be forwarded to 168 Broomhill Drive, Glasgow, W.1., before August 31, 1953.

A. CHRISTIANSON,
Divisional Secretary.
July 31, 1953. (E 550)

SOUTH EASTERN ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN

Surrey Sub-Area Engineering Department, Dorking

SALARY within the range £433 to £567 under Schedule "D," Grade 6, of the N.J.B. Agreement. Superannuable. Duties include detailed lay-out of indoor and outdoor substations, together with switch and control-gear wiring diagrams, and general network diagrams and plans.

Applications, giving the names of two referees, must reach C. W. Hughes, B.Sc., M.I.E.E., Surrey Manager, SEEBoard, Rough Rew, Horsham Road, Dorking, Surrey, by August 28, 1953.

A. L. BURNELL,
Secretary.
August 7, 1953. (E 574)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for a position as:—

GENERAL ASSISTANT ENGINEER (CABLES)
Transmission Department. S/13.426.

Applicants should be experienced in the design, manufacture, installation and maintenance of underground cables. Knowledge of oil-filled and gas pressure cables up to 132 kV would be an advantage. Preference will be given to those who are graduates of the I.E.E. or who hold equivalent qualifications.

Salary N.J.B. "AX/CX 8", £501 to £675.

Special application forms obtainable from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth, should be returned by August 26, 1953. (E 589)

NORTH WESTERN ELECTRICITY BOARD

No. 7 Sub-Area

APPOINTMENT OF METER TESTERS
Romiley Depot

RATE of pay: 44d. per hour. 44-hour 5-day week. N.J.I.C. Conditions.

Applicants should have had experience in the testing and calibration of single- and poly-phase a.c. meters.

Application forms can be obtained from the Sub-Area Manager, The North Western Electricity Board, No. 7 Sub-Area, Chapel Street, Hazel Grove, Cheshire, and must be returned to him by August 22, 1953. (E 570)

READVERTISEMENT

CITY OF SALISBURY

Southern Rhodesia

APPLICATIONS are invited for the following fixed establishment post in the Electricity Department of the above Municipality:—

GENERATION ENGINEER (salary scale £1,600 by £50 to £1,800 p.a.). Applicants must have had extensive experience in the operation and control of large steam generating plants, preferably including experience with pulverised fuel fired boilers, and must be fully qualified mechanical and electrical engineers.

The above appointment is subject to Council's Service and Leave Regulations, which will be made available for inspection by selected candidates at the offices of the undersigned. The salary payable will commence at the minimum of the above grade, rising by annual increments to the maximum salary of the grade (no cost-of-living or other allowances are payable).

The successful candidate must be able to comply with the regulations of the Southern Rhodesia Immigration Authorities, and will be required to submit a satisfactory medical certificate.

Applicants, who should not be more than 45 years of age, are requested to submit full particulars of their qualifications, training and experience, giving details of positions held and salaries received, marital state, age, place of birth and nationality. Copies of not more than three recent testimonials may be included.

Canvassing, directly or indirectly, will be a disqualification.

Applications, suitably endorsed on the cover, must reach the office of the undersigned on or before Saturday, September 5, 1953. Airmail paper should be used.

DAVIS AND SOPER, LTD.
Agents to the City Council of Salisbury.

52 and 54 St. Mary Axe,
London, E.C.3.
August 6, 1953. (E 569)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 5 (Wakefield) Sub-Area

Castleford District

THIRD ASSISTANT DISTRICT ENGINEER

Applicants must have had a sound practical training and considerable experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground distribution networks, substation plant and ancillary equipment.

Applicants must hold a current driving licence, be prepared to reside in the district and undertake standby duties.

Preference will be given to those who are Corporate Members of the Institution of Electrical Engineers or who hold equivalent qualifications.

Salary N.J.B., Class "E," Grade 9, £587 to £600 per annum.

Applications, giving full details of age, experience and qualifications should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than August 27, 1953.

No. 6 (Hull) Sub-Area

DEMONSTRATOR

Applicants must have had a two-year full-time course in domestic subjects at a recognised training college and possession of the E.A.W. Certificate will be an advantage. The successful candidate will normally be located at Hull, but may be required to work throughout the Sub-Area if occasion demands.

Salary N.J.C., Grade 1, £360 to £470 per annum.

Applications, giving full details of age, experience and qualifications, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Kingston upon Hull, not later than August 27, 1953. (E 562)

LONDON ELECTRICITY BOARD

SENIOR ASSISTANT (GRADE 4)

Sub-Area Commercial Department

APPLICATIONS are invited for the above position in the North Western Sub-Area, located in Central London.

Applicants should have had experience in the commercial development of electricity supply, including electrical contracting activities and consumers' service sections, and the administration of maintenance departments and consumer service offices.

The post is graded within the National Joint Council Agreement (Administrative and Clerical Grades) as Grade 4, i.e. £595 to £672 per annum inclusive.

Application forms, obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed within 10 days of the publication. Please enclose addressed envelope and quote Ref. V/1630/T. on all correspondence. (E 576)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Glasgow Sub-Area

APPLICATIONS are invited for the following appointments:—

The positions are superannuable under the British Electricity Authority and Area Boards Superannuation Scheme.

The conditions of employment will be those of the National Joint Board and the salaries in accordance with that agreement.

The successful applicants will require to reside within a reasonable distance of their respective headquarters.

THIRD ASSISTANT ENGINEER (CONSTRUCTION)

Sub-Area Headquarters

Applicants should have experience in and supervision of cable-laying and jointing, erection of all sub-station equipment, including transformers, h.v. and l.v. switchgear, testing and commissioning of plant. A sound technical knowledge is essential and Corporate Membership of the Institution of Electrical Engineers or equivalent qualification would be an advantage.

Salary scale: £766 to £794 per annum, Class "L," Grade 10, National Joint Board Agreement.

FIRST ASSISTANT DISTRICT ENGINEER

Central District

Applicants should have a sound engineering training and subsequent experience with underground h.v. and l.v. distribution systems, including the maintenance and operation of h.v. and l.v. switchgear, fault location on h.v. and l.v. cables, and testing and protection gear. Corporate Membership of the Institution of Electrical Engineers or equivalent qualification would be an advantage.

Salary scale, £831 to £867 per annum, Class "G," Grade 5, National Joint Board Agreement.

Application should be made on form to be obtained from the undersigned, or the applicant's appropriate officer, and should be completed and returned to me not later than Saturday, September 5, 1953.

A. KELSO,
Manager.

75 Waterloo Street,
Glasgow, C.2.
August 7, 1953. (E 571)

LONDON ELECTRICITY BOARD

JUNIOR ENGINEER (CONSTRUCTION)

APPLICATIONS are invited for the above position in the Construction Branch at Hampstead, N.W.3.

Applicants should have received a sound general and technical education at least to the graduate I.E.E. standard. They should have completed an engineering apprenticeship with an electrical manufacturer or supply authority, and should have sound practical experience in three-phase h.v. and l.v. distribution.

The post is graded under the National Joint Board Agreement as Class "J," Grade 13, commencing salary £427 per annum inclusive, rising, in accordance with Clause 35 to Grade 14—£572 5s. per annum, inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by August 26, 1953. Please enclose addressed foolscap envelope and quote ref. V/1612/T. (E 567)

LONDON ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN

APPLICATIONS are invited for the position of ENGINEERING DRAUGHTSMAN for electrical plant layout in the drawing office of the Chief Engineer's Department in Central London.

Applicants should preferably have served an engineering apprenticeship and have had good technical training, together with experience in the layout of transforming plant, switchgear and cables for operation on voltages up to 66 kV.

The post is graded under Schedule "D" of the National Joint Board Agreement as Grade 5, £595 7s. to £704 11s. per annum, on Grade 6, £458 to £595 7s. per annum. These figures are inclusive of London allowance, and the commencing salary will be dependent upon qualifications and experience.

Application forms from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed within 7 days of the publication of this advertisement. Please enclose addressed foolscap envelope and quote Ref. V/1580/T. on all correspondence. (E 577)

ALLEN WEST AND CO., LTD., require for their Brighton Sales Department, senior SALES ENGINEERS. Must have held similar positions and be conversant all types motor control gear, especially contactor gear.—Applications stating qualifications, experience and salary required to J. H. Hall. (E 504)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following position:—

ASSISTANT SHIFT CHARGE ENGINEER
Poole Generating Station—S/13.430

Applicants should have had previous experience in a large modern generating station, and preference will be given to those with experience of high operating temperatures and pressures, and pulverised fuel equipment. Manufacturing works experience will be an advantage.

Preference will be given to those who possess qualifications leading to corporate membership of a recognised professional institution.

Salary N.J.B. "H/9," £680 to £706.

Special application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by August 26, 1953. (E 588)

AREA SUPERINTENDENT

REQUIRED by the SIERRA LEONE GOVERNMENT ELECTRICITY DEPARTMENT for two tours of 18-24 months either (1) with prospect of pensionable employment at salary etc. in scale £742, rising to £1,177 a year, or (2) on temporary terms at salary etc. in scale £899, rising to £1,156 a year with gratuity of £100 a year. Commencing salary according to experience. Outfit allowance up to £60. Free passages. Candidates must have served an appropriate apprenticeship and have had some years' practical experience in a responsible position on the operation and maintenance of diesel alternator generating sets ranging from 3) to 150 kW. They must also have had experience in the erection, operation and maintenance of h.v. (up to 11 kV) and l.v. overhead distribution systems.

Write to the Crown Agents, 4 Millbank, London S.W.1, State age, name in block letters, full qualifications and experience and quote M2C/28553/EE. (E 594)

A SENIOR and JUNIOR DRAUGHTSMAN required for work on electrical power resistances and large electrical heaters for industrial applications. Previous experience on this class of work desirable but not essential.—Apply by letter with full details, including age, technical qualifications, whether married or single, and salary required, to The Expanded Metal Co., Ltd., Stranton Works, West Hartlepool. (E 564)

AN ASSISTANT ELECTRICAL ENGINEER for installation and maintenance work, age 23 to 26 years. Candidates should hold a university degree in electrical engineering and have served a graduate apprenticeship. A knowledge of instrumentation, automatic control and electronics would be advantageous. The post is at our Yorkshire factory but replies should be addressed to the Chief Personnel Officer, Pilkington Brothers Ltd., St. Helens, Lancashire. (E 599)

ASSISTANT ENGINEERS experienced in the survey and construction of overhead transmission lines in Scotland, mainly wood pole types, but knowledge of tower work an advantage.—Give full details, age, experience etc., to Box No. 931, Keith and Co., Advertising Agents, Edinburgh. (E 579)

ASSISTANT MANAGER required in the Industrial Heating and Cooking Sales Dept. at our Blythe Bridge factory. The successful applicant, who must have technical sales knowledge of electricity and catering equipment, will be required to reside in the vicinity of Blythe Bridge. Applications, which will be treated in strict confidence, should state age, qualifications, previous experience and salary required, and be addressed to the Manager, Industrial Heating and Cooking Sales Dept., Simplex Electric Co. Ltd., Grindley Lane, Blythe Bridge, near Stoke-on-Trent, marking the envelope "Private." (E 592)

BRITISH ELECTRICITY AUTHORITY Headquarters, London, require CHIEF ASSISTANT ENGINEER in Generation Operation Branch. Candidates should preferably be Corporate Members of the I.E.E., or I.Mech.E., and have an engineering degree. Duties include the assessment and analysis of generating station operation and plant performance with special emphasis on improvement of efficiency, economy and availability. Wide experience in the electricity supply industry is desirable and candidates should also be familiar with testing, statistical and operational research techniques. Salary provisional range £1,575 to £2,000 p.a. inclusive. Pension scheme. Applications to D. Moffat, Director of Establishments, Winsley St., London, W.1, stating age, full details of training, qualifications and experience, present position and salary by August 31, 1953. Quote Ref. AE/404. (E 551)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

BRITISH ELECTRICITY AUTHORITY, Headquarters, London, require a SENIOR ASSISTANT in the Civil Defence Section, Secretary's Department. Candidates, who will be required to supervise a small office in the absence of the Civil Defence Officer, should preferably hold a Home Office Green or White Instructors' Certificate. Duties include dealing with correspondence, enquiries, drafting papers for the Civil Defence Advisory Committee, co-ordinating Civil Defence literature and information for circulation to Civil Defence officers in the industry. Salary: N.J.C. Grade 5, i.e. £672 by £20 to £735 p.a. including London Allowance. Pension scheme.—Applications to D. Moffat, Director of Establishments, Winsley Street, London W.1, by August 25, 1953. Quote reference AE/405. (E 580)

DEPUTY POWER STATION SUPERINTENDENT required for service with the Sudan Light and Power Co., Ltd. in Khartoum, Anglo-Egyptian Sudan. Basic salary on appointment £E.1,500 per annum (£E.1—£1 0s. 6d.) Candidates should be between the age of 30 and 40 and must be corporate members of the Institution of Mechanical Engineers; have had not less than 10 years' experience in the design, construction and operation of modern power stations equipped with boilers and turbo-alternators operating under steam conditions up to 400 lb. per sq. in. in pressure and 750 deg. F. superheat; and e.h.t. switchgear and associated control equipment. Corporate membership of the I.E.E. and experience with oil-fired boilers and diesel alternators up to 1,200 kW also most desirable. Evidence should be adduced of having held positions of responsibility requiring organising and administrative powers and the ability to control staff. Initially duties will include relieving the Power Station Superintendent of day-to-day administrative work in the existing diesel power station and supervising the erection and equipping of a steam station.

In addition to basic salary a cost-of-living allowance will be payable; and a kit allowance of £E.50 on appointment.

Appointment will be on contract up to 10 years, including a period of 12 months probation, with a bonus payable on completion of the contractual period. Free living accommodation with basic furniture or an allowance in lieu thereof and free transport will be provided. After satisfactory completion of the probationary period liberal leave on full salary with free passages. There is at present no income tax in the Sudan.

Applications stating age, education, qualifications, experience (with particulars of posts held) present appointment and salary with names of two references should be submitted to the Secretary, The Power and Traction Finance Co., Ltd., Queens House, Kingsway, London, W.C.2. (E 595)

ELECTRICAL DRAUGHTSMAN required for Manchester office of consulting engineers. Age 20 to 22 years. Experience in layout of services and equipment an advantage. Must have completed National Service.—Full details of age, training, qualifications, experience and remuneration required, to R. W. Gregory and Partners, Consulting Engineers, Cromford House, Cromford Court, Manchester 4. (E 581)

ELECTRICAL ENGINEER experienced in power station installation and commissioning, prepared to work on own initiative. A.M.I.E.E. or equivalent qualification. —Write, Box E.T.569, c/o 191 Gresham House, E.C.2. (E 547)

ELECTRICAL ENGINEER required to take charge of Overhead Line Contracts in England and Scotland. Experience essential, knowledge of surveying an advantage. Position is permanent, pensionable and offers excellent opportunities for right man.—Applications, giving particulars of age, training, experience and salary required to Employment and Welfare Manager, Johnson and Phillips Ltd., Victoria Works, Charlton, London S.E.7. (E 497)

ELECTRICAL ENGINEERS required for inside sales and contract work dealing with metal rectifier equipments. Degree or H.N.C. essential. Housing accommodation available within 6 to 9 months.—Write giving age, qualifications and experience to Personnel Manager, Standard Telephones and Cables, Ltd., Warwick Road, Boreham Wood, Herts. (E 582)

ELECTRICAL ENGINEER to be responsible for electrical and mechanical design of overhead line insulators. Training will be given as necessary. The post is superannuable and offers opportunities for promotion. Degree in electrical engineering is an essential qualification and a recognised apprenticeship with a large industrial manufacturer desirable. Age 23-30. Salary according to age, experience and qualifications.—Replies to the Chief Personnel Officer, Pilkington Brothers Ltd., St. Helens, Lancashire. (E 598)

ELECTRIC PADS AND BLANKETS. A person (either sex) capable of starting up and building up manufacturing unit. Location North Essex. Must have actual experience of quality production and be capable of taking sole charge. No clerical work, as all accountancy, wages, etc., would be taken care of. Strict disciplinarian. State fullest particulars in reply to Box No. 2835, Electrical Times. (E 552)

HEAVY electrical engineering firm, Manchester area, requires SALES ENGINEER with experience in tendering, holding at least Higher National Certificate. Interesting work and good prospects.—Apply, in writing, stating age, experience and salary required, marking envelopes "Sales Engineer," to Box No. 2827, Electrical Times. (E 518)

IMPORTANT firm of electrical equipment manufacturers require FIRST-CLASS MAN (age 30-35) with technical qualifications of degree standard for progressive executive position in Production Department. Applicants must have initiative, good organising ability and previous experience in works administration.—Applications, which will be treated in confidence, to Box No. 2841, Electrical Times. (E 583)

INSULATION ENGINEER wanted to supervise technical processes and insulation development concerning high voltage a.c. machines and large d.c. machines. Previous experience preferred. Applicants should possess an honours degree in electrical engineering or equivalent.—Reply to Dept. C.P.S., The English Electric Co., Ltd., 336-7 Strand, W.C.2, quoting Ref. 433A. (E 565)

JUNIOR TECHNICAL ASSISTANT required for export sales department of West London instrument manufacturers. Ordinary National Certificate standard. Man having completed National Service preferred.—Write, giving particulars of education, experience and salary required, Box No. 2837, Electrical Times. (E 566)

JUNIOR TECHNICAL SALES REPRESENTATIVE required to handle electricity meters, instruments, relays and remote control equipment.—Please apply with full particulars to General Manager, Measurement Ltd., Terminal House, Grosvenor Gardens, London S.W.1. (E 558)

LEADING FIRM of manufacturing electrical engineers require MANAGER with first-class sales organising and selling experience for Scotland. Branches at Glasgow and Edinburgh.—Write stating age, experience and salary required to Box No. 6961, c/o Charles Barker and Sons Ltd., 31 Budge Row, London E.C.4. (E 553)

LONDON ELECTRICITY BOARD require FITTER (Electrical) at Woolwich, S.E.18. N.J.I.C. rates and conditions 4s. per hour.—Application forms from Establishments Officer, 46 New Broad Street, E.C.2. Please enclose addressed envelope and quote Ref. M/2371/T. (E 554)

LONDON ELECTRICITY BOARD require WIREMEN and MATES for contracting work at Clapham, Bedford. N.F.E.A. rates and conditions. Wiremen 4s. per hour, Mates 3s. 4½d. per hour; plus country allowances. Experience of installation of pyrotenax cables an advantage or experience on fairly large industrial work. —Application forms from Establishments Officer, 46 New Broad Street, E.C.2. Please enclose addressed envelope and quote Ref. EST/C/T. (E 555)

METER MANUFACTURERS, N.W. London, require SENIOR AND JUNIOR TEST ENGINEERS for progressive posts in their test depts. State education, technical training, experience, salary required.—Box 2839, Electrical Times. (E 567)

METER TESTERS required by LONDON ELECTRICITY BOARD at Hackney, E.8. N.J.I.C., 4s. per hour.—Application forms from Establishments Officer, 46 New Broad Street, London E.C.2. Please enclose addressed envelope and quote ref. M/2363/T. (E 584)

RELAY manufacturers require a young ENGINEER to deal with technical inquiries, prepare circuits etc., and check proposals by laboratory tests. Would also have to do some work on Services Development Contracts. Relay experience and a knowledge of waveguide work and Services development procedure would be useful but are not so important as initiative and good basic electrical knowledge. Apply, Besson and Robinson Ltd., 6 Government Buildings, Kidbrooke Park Road, London S.E.3. (Tel.: LEE 8541-5). (E 593)

REPRESENTATIVE of outstanding ability required for London and Home Counties by a leading electrical engineering company. Applications will only be considered from experienced men with a connection in the lamp and electrical industry.—Write with full details of age, experience, qualifications and salary required to Staff Manager, Siemens Electric Lamps and Supplies Ltd., 38-39 Upper Thames Street, London E.C.4. (E 556)

SENIOR REPRESENTATIVE required to handle the sale of electricity meters, relays, remote indicating, recording and controlling equipment to electricity boards, public authorities and industrial users. Technical knowledge and previous experience in a similar position required.—Please apply with full particulars to General Manager, Measurement Ltd., Terminal House, Grosvenor Gardens, London S.W.1. (E 557)

THE RIO DE JANEIRO TRAMWAY, LIGHT AND POWER CO., LTD., a British company in Brazil, invite applications from suitably qualified men for a post in Rio de Janeiro as JUNIOR ELECTRICAL ENGINEER. Candidates should be young, single, recent graduates in electrical engineering and should have had post-graduate experience in the shops and laboratories of a meter manufacturer. Salary will be in accordance with qualifications and experience, taking into consideration local cost-of-living; three years' agreement subject to renewal, with first-class passage both ways; four months' leave on full pay after three years' service; superannuation scheme.—Written applications, which will be treated in confidence, should be made to Mr. W. P. Kellett, Joint Manager, Canadian-Brazilian Services, Ltd., 148 Leadenhall Street, London E.C.3. Applications should be received by August 31, 1953. (E 519)

TRANSFORMER DESIGNER for small power transformers, chokes and saturable reactors up to 50 kVA. Experience of modern materials and manufacturing techniques necessary. Degree or H.N.C. essential. Housing accommodation available within 6 to 9 months.—Write, giving age, qualifications and experience, to Personnel Manager, Standard Telephones and Cables Ltd., Warwick Road, Boreham Wood, Herts. (E 585)

TRANSFORMER ENGINEER required, fully experienced in the design of large transformers. This position offers excellent opportunities for an ambitious engineer with the necessary experience.—Write, giving full particulars, to Box No. 2843, Electrical Times. (E 586)

VACANCIES exist for ASSISTANT ENGINEERS for work in connection with the application of insulators and insulating materials in high voltage switchgear, etc. The work includes experimental and theoretical investigations into dielectric phenomena, stress control, corona, insulation co-ordination and new insulating materials and techniques. Applicants should possess a degree or Higher National Certificate in electrical engineering.—Please apply, with full particulars, to the Chief Engineer, A. Reyrolle and Co., Ltd., Hebburn, Co. Durham. (E 508)

WORKS MANAGER required by responsible and established electric cable manufacturers in South Africa. Applicants must possess sound knowledge in the manufacture of all types of paper, rubber and plastic insulated cables. They should also have sound technical qualifications and be fully conversant with modern works administration and labour control. A suitable company house would be available for the successful applicant. This is a senior executive appointment with excellent prospects, and only those with the necessary qualifications should apply.—Applications, which will be treated in the strictest confidence, to Scottish Cables Ltd., Deanside, Renfrew. (E 587)

W. T. GLOVER AND CO., LTD., Electric Cablemakers, Trafford Park, Manchester, are extending the Accessories Drawing Office and Design Section. One further DRAUGHTSMAN is required, either experienced in the design of cable accessories up to the highest voltages, or capable of responding to quick training in this field. The position is progressive and offers good opportunities for advancement.—Apply, giving full details, to the Secretary. (E 596)

APPOINTMENTS WANTED

EXPERIENCED ELECTRICIAN (28), wide experience electrical installations, seeks progressive position in England.—Box No. 2819, Electrical Times. (E 475)

WORK WANTED

A.C. and d.c. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines). —Service Electric Co., Ltd., Stanmore, Middx. (E 13)

ARMATURE REWINDING service to the trade, Vacuums, Drills, Grinders, Hood Dryers, Dental Motors. Vacuum cleaner and drill armatures replaced from stock. 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make. Apex washer agitator shafts stocked.—Regam Electric Cleaner Service, 95 Park Lane, Leeds 1. (E 429)

FISHER FOUNDRIES LTD., Greet, Birmingham, have immediate capacity for machine moulded PRECISION CASTINGS in gunmetal and grey iron, ¼ to 30 lb. All castings shot blasted.—Telephone: Birmingham, Victoria 0197. (E 17)

WORK WANTED. Capacity available for all types of COIL WINDING.—Box No. 2425, Electrical Times. (E 18)

WANTED

A.C.-D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (E 8)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (E 4)

WANTED, for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (E 1)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox water-tube boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath, Staffs. (E 2)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (E 6)

500 cycle single and three-phase ALTERNATORS between 1 to 10 kVA ratings. Any speed. MERCURY ARC RECTIFIERS, 2-wire d.c. outputs, 230 and 460 volts, between 1 to 100 kW ratings. Power Factor CORRECTION CONDENSERS, all sizes.—Replies to Whitefield Machinery & Plant, Ltd., Cobden Street, Pendleton, Salford 6. (E 478)

AGENCIES

M.A.A.—THE BADGE OF A GOOD MANUFACTURERS' AGENT. Manufacturers requiring reputable Agents are invited to communicate with the Secretary, The Manufacturers' Agents Association of Great Britain and Ireland (Inc.), Rosebery House, 8 Breams Buildings, London E.C.4. Membership available to established agents only. Particulars supplied. (E 40)

FOR SALE

CABLES & WIRE

TINNED STEEL ARMATURE BINDING WIRE. All sizes from 14 s.w.g. to 30 s.w.g. supplied in coil or on reels.—Frederick Smith and Co., Wire Manufacturers, Ltd., Caledonia Works, Halifax. (E 41)

DOMESTIC APPLIANCES

G.B.M. IMMERSION HEATERS, 26 in., 3 kW, 230/250 V, withdrawable-type elements, "Satchwell" thermostat, sweating flange, complete £6 5s. each, carriage paid. Six for £37. Cash with order.—G. D. Harrison and Sons, Ltd., 55 Northgate, Huddersfield. (E 568)

GENERATING PLANT

STEAM-DRIVEN GENERATING SETS. UNUSED 750-kW, 937.5-kVA condensing turbo ALTERNATOR SET by Daniel Adamson, steam pressure 190/270 lb. sq. in., 550/730 deg. F., direct coupled through reduction gear to Mather and Platt alternator, 440/3/50, 1,500 r.p.m., with surface condenser. It is possible to modify this set for operating as passout under certain conditions.

600-kW, 750-kVA turbo ALTERNATOR SET with turbine by Weir, steam pressure 150/190 lb. sq. in. superheated 80 deg. F., back pressure 15 lb. sq. in. Turbine direct driving through David Brown reduction gear alternator by E.E.C., 400/440/3/50. With switchgear.

George Cohen, Sons and Co. Ltd., Wood Lane, London W.12. Tel.: Shepherds Bush 2070; and Stanningley nr. Leeds. Tel.: Pudsey 2241. (E 559)

LIGHTING EQUIPMENT

PURLEY CHOKES AND BALLASTS. Our 80-W tapped h.p.f. ballast, with starter switchgear-holder incorporated, is proving itself the most popular unit. Suitable for most fittings 57s. 6d. each subject.—F. W. Blanshard Ltd. (Dept. E.T.), Purley, Surrey. Uplands 4818-9. (E 14)

METERS

A.C.-D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, London N.W.4. (E 5)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (E 10)

MOTORS & STARTERS

A.A. ELECTRICAL CO. for A.C.-D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Chiswick 5606, 67 Rothschild Road, W.4. (E 7)

All types and sizes of

Industrial Electrical Equipment

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Road, London N.W.9
Telephone: COLindale 4621/2. (E 12p)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9.) (E 3)

A.C. and D.C. MOTORS, GENERATORS from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566-9. (E 9)

NEW f.h.p. MOTORS. 400-440 V, 3 ph., 50 cyc., 1,440 r.p.m. By S.E.M., Newman Brooks, ½, ¾, 1 h.p., 28 only. Bargain price the lot.—The Thecla Engineering Co., Ltd., Allan Street, Darlington. (E 501)

SWITCHGEAR

MERCURY SWITCHES are made by Hall, Dryadale and Co. Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: BOW 7221. (E 11)

TIME SWITCHES for sale. Reconditioned or new. 12 months guarantee. Immediate delivery. Lists from J. W. Hughes, 3 St. Thomas' Street, London Bridge, S.E.1. (Tel.: HOP 2759). (E 502)

UNCLASSIFIED

A HIGH VACUUM IMPREGNATION UNIT, to R.I.C. Specification 214 or individual requirements.—Good delivery at competitive prices from Blickvac, 505 Lordship Lane, S.E.22. Forest Hill 7089. (E 19)

FOR immediate delivery. Coles diesel/electric 6-ton mobile JASON CRANE, new August, 1951; and Coles petrol/electric Mk. VII Series VII 5-ton MOBILE CRANE. Both with B.o.T. Certificates. Several 22 and 28 kVA GENERATING SETS, 400/50/3, both petrol and diesel powered. Also 230 V a.c. and 120 V d.c. sets, trailer mounted.—Chessington Salvage Co., Ltd., Church Lane, Chessington, Surbiton, Surrey, England. Tel.: Epsom 4026 (4 lines). (E 308)

TWO Mirrlees, Bickerton and Day 480 b.h.p. DIESEL ENGINES at 200 r.p.m. coupled to two Metro-Vickers 325 kW alternators, complete with switchgear.

One Paxman-Ricardo type 12 DIESEL ENGINE, 400 b.h.p. at 1,000 r.p.m. coupled to 300 kVA Asea alternator complete with switchgear.

The three £12,000 (or sold separately).

Nine Type PBH 4000 INDUSTRIAL BLOWERS each complete with 90 h.p. electric motor, starter and control gear and fitted with Type MTD and Type CA12 silencers. (Duty of blower—suck or blow 3,000 cu ft of air per minute through 10,000 ft of 15-in. pipe), each £825.

Two brand new 90 h.p. Crompton-Parkinson ELECTRIC MOTORS at 2,900 r.p.m., each £280.

One Broom-Wade Type EH251 stationary ELECTRIC COMPRESSOR, 495 cu ft min. at 100 lb. p.s.i., complete with 112 h.p. motor, starter, vee drive, etc., £1,150.

Two Broom-Wade Type EH241 stationary ELECTRIC COMPRESSORS, 330 c.f.m. at 100 p.s.i., complete with 75 h.p. motor, starter, vee drive, etc., each £775.

Grayston Plant and Engineering Co., Ltd., 68 Victoria St., London S.W.1 (Victoria 3567 or Tate Gallery 0126). (E 600)

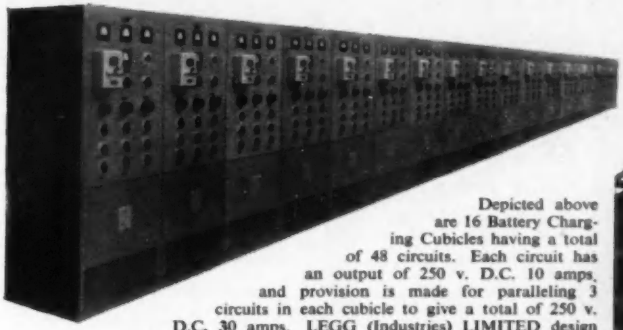
MISCELLANEOUS

CITY AND GUILDS (Electrical, etc.) on "No Pass—No Fee" terms. Over 95 per cent. successes.—For full details of modern courses in all branches of Electrical Technology send for our 144-page handbook FREE and post free.—B.I.E.T. (Dept. 39), 17 Stratford Place, London W.1. (E 15)

FREE! Brochure giving details of courses in ELECTRICAL ENGINEERING and ELECTRONICS, covering A.M.Brit.I.R.E., City and Guilds, etc. Train with the Postal Training College, operated by an Industrial Organisation. Moderate fees.—E.M.I. Institutes, Postal Division, Dept. ET.29, 43 Grove Park Road, London W.4. (Associate of H.M.V.) (E 251)

THE PROPRIETOR of British Patent No. 603275, dated December 5, 1945, entitled "IMPROVEMENTS IN APPARATUS FOR AUTOMATIC TELEPHONE SYSTEMS," offers same for licence or otherwise to ensure its practical working in Great Britain.—Inquiries to Singer, Stern and Carlberg, Chrysler Building, New York 17, N.Y., U.S.A. (E 525)

16 BATTERY CHARGING CUBICLES



Depicted above are 16 Battery Charging Cubicles having a total of 48 circuits. Each circuit has an output of 250 v. D.C. 10 amps, and provision is made for paralleling 3 circuits in each cubicle to give a total of 250 v. D.C. 30 amps. LEGG (Industries) LIMITED design and manufacture equipment incorporating metal rectification for all purposes where a D.C. Supply is required from an A.C. source, also Transformers, Air Cooled and Oil Immersed, up to 150 KVA capacity.

This panel has been specially designed and manufactured for an overseas customer.

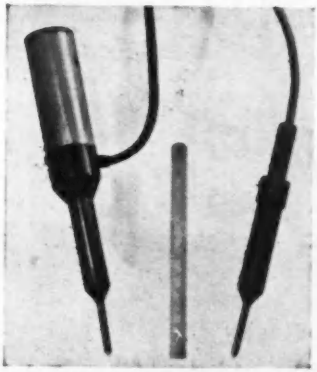
A section of the rear view of 3 typical cubicles.

Legg INDUSTRIES LTD · WILLIAMSON ST · WOLVERHAMPTON

MEDIUM VOLTAGE ALL INSULATED

TEST LAMP

100 to 500 volts — A.C. or D.C.



★ H.R.C. FUSE IN EACH PROD

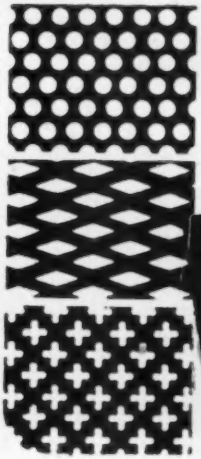
Comprises a 250 v., 15 w. pigmy lamp, wired in series with a resistance. Can be easily carried in the pocket.

JOHN DRUMMOND (ENGINEERS) LTD.

23 LOCHBURN ROAD, MARYHILL, GLASGOW, N.W.

Manufactured under licence from the Ministry of Supply

PERFORATED METAL . . .



Our large range of perforations is available for your selection—quick delivery.

ASH and LACY

MERIDEN ST · BIRMINGHAM

2515 D

INDEX TO ADVERTISERS

Aidas Electric Co., Ltd. 75
Arora Co. 76
Arrow Electric Switches, Ltd. ... 5
Ash & Lacy, Ltd. 57
Association of Steel Conduit Manufacturers 78
Aston Chain & Hook Co., Ltd. 35
Astor, Boisselier & Lawrence, Ltd. 68
Bray, George & Co., Ltd. ... 74
Britannic Electric Cable & Construction Co., Ltd. 9
British Driver-Harris Co., Ltd. 70
British Electricity Authority ... 44
British Geon, Ltd. 46
British Institute of Engineering Technology 12
British Insulated Callender's Cables, Ltd. 25
British Physical Laboratories, Ltd. 60
British Thomson-Houston Co., Ltd. 40
Brook Motors, Ltd. 22
Brush Electrical Engineering Co., Ltd. 28
Burco, Ltd. 19
B.V.C. Industrial Constructions, Ltd. 43
Cable Makers Association ... 67
Cayson Electrics, Ltd. 30
Channel Conduits, Ltd. 70
Clang, Ltd. 64
Cooper & Co. (Birmingham), Ltd. 2
Copper Development Association 6
Crabtree, J. A., & Co., Ltd. ... 17
Cressall Manufacturing Co., Ltd. 4
Critchley Bros., Ltd. 62
Crockatt, W. & Sons, Ltd. ... 72
Crompton-Parkinson, Ltd. 77
Drummond John (Engineers) Ltd. 57
Enfield Cables, Ltd. 13
Engineering & Marine Exhibition 68
English Electric Co., Ltd. ... 37
Enthoven Solders, Ltd. 26
Essex Partners, Ltd. 66
Evans & Newall, Ltd. 64
Falk, Stadelmann & Co., Ltd. ... 59
Ferranti, Ltd. 1, 11
General Cable Manufacturing Co., Ltd. 20
General Electric Co., Ltd. 27, 48, 61
Gillott Electro Steam Cookers, Ltd. 66
Green, E. & Son, Ltd. 32
Grelco, Ltd. 76
Grubb Engineering Co., Ltd. ... 15
Harris John Tools, Ltd. 21
Hedin, Ltd. 60
Henley's W. T., Telegraph Works Co., Ltd. 16, 49
Higgs Motors, Ltd. 10
Ivor Power Speciality, Co., Ltd. 29
Johnson & Phillips, Ltd. 45, 63
Kempston Electrical Co., Ltd. ... 72
Legg (Industries) Ltd. 57
Low Duncan, Ltd. 38
Lyons, Claude, Ltd. 39
Martindale Electric Co., Ltd. ... 58
Mather & Platt, Ltd. 24
Metropolitan-Vickers Electrical Co., Ltd. 33
Metway Electrical Industries, Ltd. 38
Midland Electric Manufacturing Co., Ltd. 41, 42
Multi Reflector Fires 4
Nife Batteries, Ltd. 3
Parmiter Hope & Sugden, Ltd. 79
Phillips Control (G.B.), Ltd. ... 74
Pilkington Bros., Ltd. 34
Production Promotion 12
Pyrotenax, Ltd. 36
Radiovisor Parent, Ltd. ... 24
Rainsford & Lynes, Ltd. 30
Resistances, Ltd. 30
Reyrolle A. & Co., Ltd. 23
Rowlands Electrical Accessories, Ltd. 65
Sanders Wm., & Co. (Wednesbury), Ltd. 60
Sangamo Weston, Ltd. 50
Sax, Julius & Co., Ltd. 66
Serck Tubes, Ltd. 76
Sifam Electrical Co., Ltd. ... 74
Simmonds & Stokes (Niphan), Ltd. 62
Simon-Carves, Ltd. 69
Smart & Brown (Engineers), Ltd. 16
Smiths Industrial Instruments, Ltd. 4
Standard Telephones & Cables, Ltd. 71
Synthetic Carbon & Engineering Co., Ltd. 72
Thew, Edward H., Ltd. 64
Thomas Richard & Baldwins, Ltd. 7
Thompson J. Water Tube Boilers, Ltd. 80
T. M. C.-Harwell (Sales), Ltd. ... 73
Tudor Accumulator Co., Ltd. ... 14
Universal Boilers & Engineering Co., Ltd. 8
Volex Electrical Products, Ltd. 31
Washers, Ltd. 74
Westinghouse Brake & Signal Co., Ltd. 18
Whitefield Machinery & Plant Ltd. 76
Wootton & Co., Ltd. 72

MARTINDALE

hot air on tap

Martindale Hot Air Blowers, in powers from 500-3,000 watts, are ideal for the quick drying of windings of all kinds before and after varnishing, and for many other purposes connected with the electrical industry. Can be used with the heat off as blowers for dust removal and vacuum cleaning.

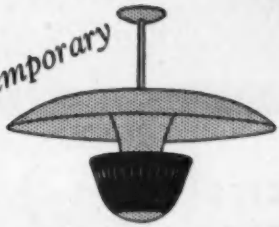
MARTINDALE ELECTRIC CO. LTD., 45 Westmorland Road, London, N.W.9

Also at 25 ELMBANK STREET, GLASGOW C.2

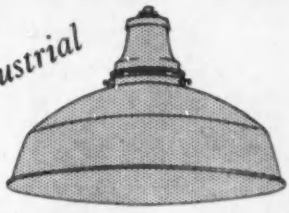
Lighting Fittings by FALKS
FALK, STADELMANN & CO. LTD.

Commercial

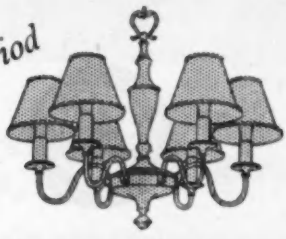
Contemporary



Industrial



Period



See the comprehensive range of electrical fittings for every industrial, commercial and domestic purpose on display at

OUR SHOWROOMS

20 22 MOUNT STREET, PARK LANE, W.1. *Telephone:* MAYFAIR 5671 2

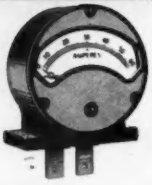
We will serve *your* customers on your behalf

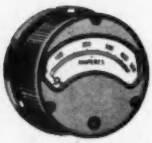
AND IN GLASGOW, MANCHESTER, BIRMINGHAM, DUBLIN, CARDIFF, SWANSEA, NEWCASTLE ON TYNE, LEEDS, LIVERPOOL, BRADFORD, NOTTINGHAM, BRIGHTON, NEWCASTLE UNDER LYME, SOUTHAMPTON, EDINBURGH, ALSO OVERSEAS

FALK, STADELMANN & CO. LTD., 91 FARRINGDON ROAD, LONDON, E.C.1

WHEN YOU WANT QUALITY
YOU WANT Quadrant
SWITCHBOARD METERS

EARLY DELIVERIES AVAILABLE OF ALL TYPES





A comprehensive range of moving iron and moving coil switchboard meters to meet every requirement both electrically and mechanically. Made to BSS.89 and K.101 all ranges are available for flush or projection mounting and such modifications as dial illumination, tropicalisation, mirror scales, waterproofing, etc., are readily supplied. Write for catalogues and prices of these meters and of our unique range of electronic instruments.

Quadrant METER CO. LTD.
DISTRIBUTED BY
BRITISH PHYSICAL LABORATORIES LTD.
Radlett HERTS
Tel : Radlett 5674-5-6

dm BP6

New... Yes
Ingenious... Very
Competitive...
...56/- each subject
...Sanders 6way S.P.&N. All Insulated Consumer Unit ....E.G. 613
SANDERS
WEDNESBURY

HEDIN

INDUSTRIAL HEATING APPLIANCES AND RESISTANCE UNITS

HEDIN, LTD.
COMMERCE ESTATE, SOUTH WOODFORD, LONDON, E.18
Tel.: Buc. 6601/2.

Know your Goods!

These facts sell the G.E.C. Refrigerator

More than 7 cu. ft. cold space

Over 13 sq. ft. shelf area with height for tallest bottles

Double freezer compartment holds 4 ice trays, 26 lb. frozen food

All foods provided for :—meat and fish chiller—2 large, glass covered saladors, plus two covered food containers

Full width drip tray

Adjustable thermostatic temperature control

Guaranteed for 12 months. Sealed refrigerating system guaranteed 5 years

Retail Price £134.0.3. Including Purchase Tax, installation and service fee

Tell your customers about the G.E.C. Refrigerator DE71

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2.

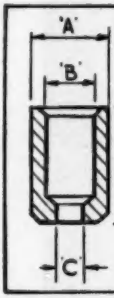
Thimble Type

CABLE MARKERS

for quick and accurate identification of cable-ends

IN BRILLIANT PERMANENT COLOURS

PLAIN OR ENGRAVED TO CUSTOMERS' REQUIREMENTS



STANDARD SIZES

SIZE	A	B	C	D
001	·187"	·125"	·048"	3/8"
01	·250"	·156"	·070"	1/2"
1	·276"	·187"	·093"	1/2"
02	·312"	·218"	·108"	1/2"
2	·354"	·250"	·140"	1/2"
03	·375"	·281"	·140"	1/2"
3	·406"	·312"	·140"	1/2"

Made for all Standard Sizes of Cables

IN BLACK, WHITE, RED, BLUE, YELLOW AND GREEN

Leaflet and samples on request

CRITCHLEY BROS LTD

BRIMSCOMBE · STROUD · GLOS

Telephone : Brimscombe 2208/9

Grams and Cables : Critchleys, Brimscombe

21084

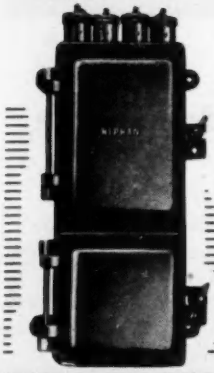
REGD. TRADE MARK

NIPHAN

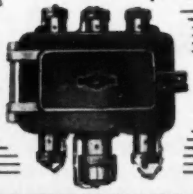
WEATHERPROOF C.I. FUSE & SWITCH FUSE BOARDS · HEAVY C.I. GROUND BOXES

Designs to requirements.

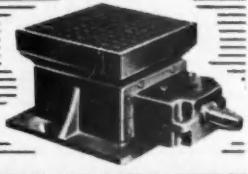
For Electric Lighting Installations and Power Transmission, Communication, Portable Tools, etc.



B1223 Type 4-way 15 amp. Switch & Fuse Board.



B7313 Type 5-way 15 amp. Fuse Board with Plug inlet.



C.I. Ground Box with Terminal Sealing Chamber and Gland.

SIMMONDS & STOKES (NIPHAN) LTD

MANUFACTURING ELECTRICAL ENGINEERS

Victoria House, Southampton Row, London, W.C.1 · Holborn 8637 and 2163

OVERSEAS AGENTS : S. AFRICA, Hubert Davies & Co. Ltd., Johannesburg. CEYLON, Walker & Greig Ltd., Colombo
NEW ZEALAND, Samuel Brown Ltd., Wellington. KENYA, R. W. Ketchley & Co., Nairobi, British East Africa

CHEAPER ELECTRICITY with J. & P. Capacitors

In many factories electricity is costing far more than it need do — an uneconomic state of affairs which could be remedied immediately if the power factor of the electrical installation were improved. The improvement of power factor is a simple matter when J. & P. Capacitors are used, and the initial cost is repaid time and time again by the money saved on electricity bills. We would be pleased to test your installation, free of charge and without obligation. Why not ask us along and see what saving *you* could achieve with J. & P. Capacitors?

Quick deliveries are assured

E

NEWALL Adjustable GIRDER CLIPS (HERRADURED FINISH)

fit all types and sizes of Girders

Standard Size for ⅜ in., ½ in. or 1 in. diameter Tubes or Armoured cables of equal diameter.

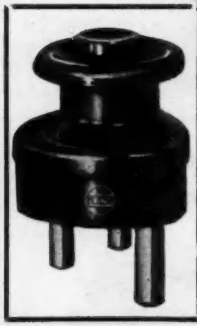
Tubes or Cables can be run at right angles or parallel to Girders, by releasing countersunk locking screw, and turning Saddle Plate one-quarter turn.

Larger Sizes for 1¼ in., 1½ in. and 2 in. diameter Tubes or Armoured cables. Multiples to order.

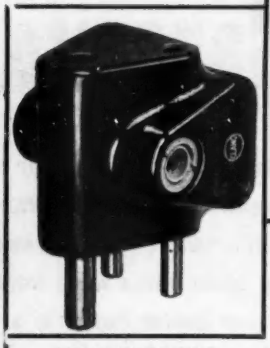
EVANS & NEWALL LTD.
(T.I.M.)
Primrose Street, New Cross, Manchester, 4
Telephone: CENtral 1253-4 *Telegrams:* "Cymric"

Illustrated Catalogue and full particulars will be forwarded on request

Reliable Accessories
of the Best Design
Over 300 different components



EJECTOR PLUG



MULTIPLUG

CEILING ROSE

LAMPHOLDER

A SELECTION FROM THE RANGE OF

CLANG
CRICKLEWOOD - LONDON
'Phone Gladstone 4201—P.B.X. Board

ENGRAVED PLATES
OF ALL TYPES & IN ALL LANGUAGES
ENAMELLED - ENGRAVED - PLASTICS
CAST - DIECAST - BRONZE
EDWARD H. THEW LTD.

3, First Avenue, Team Valley, Gateshead-on-Tyne, 11
TELEphone: Low Fell 75667
TELEgrams: "Engraving, Gateshead-on-Tyne"

R.E.A.L

"There is only one way to avoid being found out—don't do it!"
ANON.

Under modern conditions life can be quite complicated, even when one has nothing to hide. We try to make things as simple as possible for ourselves by putting our cards down "face up."
This is a big help—we can then concentrate on making our fittings as well as we know how.
And we think we *have* the "know how."

P.S.
Quite a number of engineers insist upon R.E.A.L.—
PERHAPS YOU DO?

Issued by Rowlands Electrical Accessories, Ltd., R.E.A.L. Works, Birmingham, 18

AN OPPORTUNITY

To Grasp

The "Duo-Coil"

THERMOSTATICALLY CONTROLLED

IMMERSION HEATER

FIRST IN THE FIELD
PROVED IN PRACTICE
LOWEST INSTALLED COST

Just look at the

PRICE from £3.15.3 (plus P.T.)

AND this includes the

THERMOSTAT

GILLOTT
ELECTRO STEAM COOKERS Ltd.
COTSWOLD WORKS, CHALFORD
Near STROUD, GLOS.
Telephone—Brimscombe 2276/7.

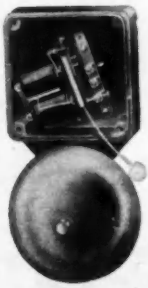
ESSEX

PATENT
FLANGES
FOR FIXING
Electric Immersion Water Heaters, Thermostats, Etc.
to closed tanks and cylinders. Removal of manlids unnecessary. No soldering.
Pure mechanical fitting into one round hole.
Sizes: ¾" to 2½" B.S.P. threads.
LIST AND TERMS FROM—

ESSEX PARTNERS LIMITED
Manufacturing and General Engineers
67 BRIDGEWATER STREET, LIVERPOOL, 1
Tel: Royal 3481-2 Grams: "Epabos" Liverpool

SAX

ALARM BELLS



3" to 10" dia GONG
WEATHERPROOF
IRONCLAD
ALARM BELLS

PROMPT DELIVERY

JULIUS SAX & CO. LTD.
24 COMMERCE RD., BRENTFORD
TELEPHONE: EALING 6034-5 ENG.

Master

Cables

C.M.A. MEMBERS WERE FIRST
with

132 kV.—ALL TYPES

(Oil filled and Gas pressure)

ALUMINIUM SHEATHED CABLES

MEMBERS OF THE C.M.A. & AFFILIATED MANUFACTURERS' ASSOCIATIONS

British Insulated Callender's Cables Ltd.
Connollys (Blackley) Ltd.
The Craigpark Electric Cable Co. Ltd.
Crompton Parkinson Ltd.
Enfield Cables Ltd.
The Edison Swan Electric Co. Ltd.
Greengate & Irwell Rubber Co. Ltd.
W. T. Glover & Company, Ltd.
W. T. Henley's Telegraph Works Co. Ltd.
Johnson & Phillips Ltd.
Liverpool Electric Cable Co. Ltd.
Metropolitan Electric Cable & Construction Company Ltd.
Pirelli-General Cable Works Ltd. (The General Electric Co. Ltd.)
Siemens Brothers & Co. Ltd. (Siemens Electric Lamps & Supplies Ltd.)
St. Helens Cable & Rubber Co. Ltd.
Standard Telephones & Cables Ltd.
The Telegraph Construction and Maintenance Co. Ltd.

CABLE MAKERS ASSOCIATION

52/54 HIGH HOLBORN, LONDON, W.C.I. TELEPHONE: HOLBORN 7633

Covering the entire field of engineering,
this Exhibition will appeal to
every Engineer in every capacity.
Make a note of the dates NOW.

Open daily (except Sundays)
10 a.m.—8 p.m.
Admission (Inc. Tax) 2/6

Organised by
F. W. BRIDGES & SONS LTD.
GRAND BUILDINGS, TRAFALGAR SQ., LONDON, W.C.2
Telephone: WHItehall 0568

with confidence, as only OKERIN Waxes are used.

Yours faithfully,
J. Power Factor

P.S. Waxes are small in bulk, but bulk large in importance, - they must be just right for the job, and reliable. Always Specify OKERIN.

PHONE: TEMPLE BAR 5927
Sales Department
ASTOR BOISSELIER & LAWRENCE LTD.
9 SAVOY STREET · STRAND · LONDON · W.C.2
Works and Laboratories · WEST DRAYTON · Middlesex

Seven 360,000 lb/hr boilers are being installed by Simon-Carves at the Chadderton (Oldham) Power Station for the North Western Division of the B.E.A. Steam conditions are 950 p.s.i. and 925°F and the boilers are fired by pulverised fuel. The coal ash and dust handling plants, the electro-precipitators, the water treatment plant and some of the civil engineering work are all included in the Simon-Carves contract at this station.

Consulting Engineers: MESSRS. KENNEDY & DONKIN

Steam power by Simon-Carves Ltd

S.C.81

STOCKPORT ENGLAND

This specialist service in NICKEL AND NICKEL ALLOYS

FURNACE ELEMENTS	Nickel alloys for long life at high temperatures; for certain special atmospheric conditions; for furnace constructional work.
DOMESTIC APPLIANCES	'Nichrome' V for long life at temperatures up to 1150° C.; 'Nichrome' for temperatures up to 950° C.; other alloys for less exacting conditions.
THERMO-COUPLES	'T1/T2' alloys (nickel-chromium and nickel-aluminium) for temperatures up to 1100° C., are identical with the best-known wires formerly imported. Also Special Advance (nickel-copper) for use with copper or iron.
RADIO and TV FIELD	Cathode nickel, pure nickel and nickel-manganese, for sleeves, anodes, grids, filaments, supports, glass metal seals, etc.
LAMP INDUSTRY	Nickel-manganese for supports, grids, and lead wires; special alloys for a variety of efficient joints between metal and glass.
SPARK PLUGS	Alloys of the correct physical properties and temper to meet manufacturing requirements in centre and side electrodes; and such as special strip for stamping out multipoint discs for aircraft plugs.
FINE WIRES	Super fine wires from 0.002 in. downwards in various alloys, such as 80/20 Nickel Chrome, Pure Nickel, etc., for specialised applications.

BRITISH DRIVER-HARRIS
CO. LTD.
MANCHESTER 15

The greatest name in electrical resistance

"NICHROME" REGISTERED TRADE MARK

Just Lately . . .

. . . we have made shipments of

CHANNEL CONDUIT

to such varied markets as those shown below —proof that overseas, as well as at home, CHANNEL CONDUIT is recognised as having more advantages than any other type of cable trunking. It is undoubtedly for this reason that so much of our output is exported.

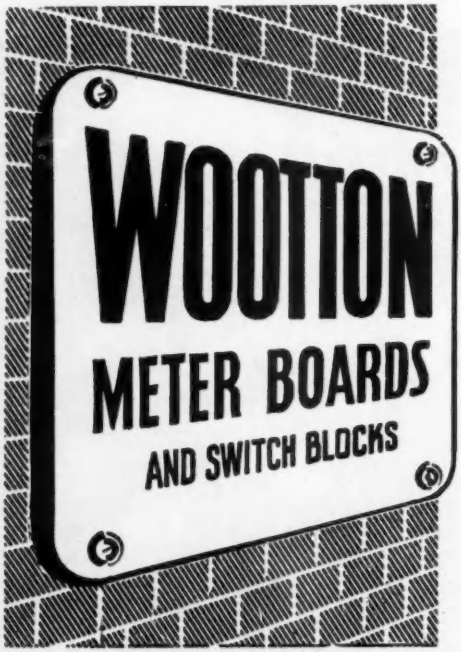
MADE IN SIZES 1″ × ½″, 1″ × 1″, 2″ × 1″, 2″ × 2″, 3″ × 2″, 4″ × 3″, with complete range of accessories.

STANDARD FINISH: rust-resisting zinc.

Please write for Pamphlet R.E.11.

CHANNEL CONDUITS LTD.
11 VICTORIA STREET . LONDON, S.W.1
Telephone: Abbey 2027/8

SELENIUM
SenTerCel
RECTIFIERS
REGD TRADE MARK
Rectifiers for Industry
Please write for Bulletin F/SRT6
Standard Telephones and Cables Limited
Registered Office: Connaught House, Aldwych, W.C.2
RECTIFIER DIVISION: Warwick Road, Boreham Wood, Hertfordshire
Telephone: Elstree 2401. Telegrams: 'Sentercel, Borehamwood'



We have been making and supplying the Electrical Industry with METER BOARDS and Switch Blocks for over 27 years

- *FIRST CLASS WORK*
- *QUICK DELIVERIES*
- *COMPETITIVE PRICES*

We invite your enquiries

WOOTTON & CO., LTD.
ALMA WORKS, PONDERS END. MIDDX.
TELEPHONE: HOWARD 1858
L1048A

Steam leakage means wasted fuel . . . stop it with a

Crockatt

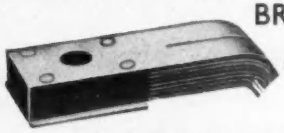
VALVE RESEATER

This tool makes valves tight without disturbing the pipeline and can be operated by one man. Self-centring and suitable for flat or mitred seats, it gives a true face, free from knurling, in a few minutes. Moderate in price—write for full details.

ALSO: Feed Water Filters; Electric Salinometers; Boiler Tube Brushes; Floor Sanders; Terrazzo Polishers; etc.

W. CROCKATT & SONS LIMITED
79 DARNLEY STREET, GLASGOW S1, SCOTLAND

SWITCH AND CONTROL GEAR SPARES
LAMINATED AND GAUZE BRUSHES



SINGLE OR DOUBLE ENDED

TO CUSTOMERS' REQUIREMENTS

SYNTHETIC CARBON & ENG. CO. LTD.
"Dept. T," Cumberland Road, Stanmore, Middx.
Telephone: WORDSWORTH 1240-4200

American Designed

RELAYS • • •
SOLENOIDS • •
OIL-TIGHT PUSH-BUTTONS

NOW MANUFACTURED BY
KEMPSTON ELECTRICAL Co., Ltd.
Suppliers of all makes of American Spares
HIGH STREET, KEMPSTON, BEDFORD
Phone : Kempston 2358

Master Switches!

"But", said the bright boy in the front row, "those are not 'master-switches'". "Oh, yes they are", replied the Head, "all Temco Switches are master switches — masterpieces in switch making . . . now pay attention and you will learn why they are 'top class', too!"

TEMCO

ELECTRICAL ACCESSORIES

✻ Temco Switches are available in surface, semi-recessed and flush-fitting styles, embodying all the latest Temco advances which make for high efficiency, safety and long service. These switches can be supplied in various finishes—brown on white, all brown or all white. We invite you to write for a copy of our complete Accessory Catalogue.

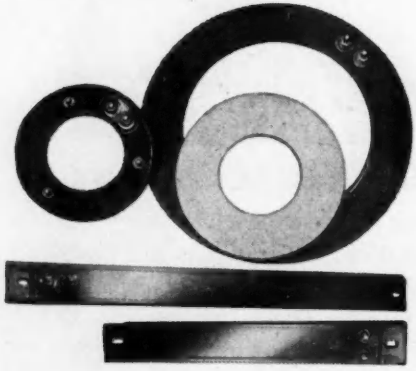
T.M.C.—HARWELL (SALES) LTD

37 UPPER BERKELEY STREET, LONDON. W.1. Tel.: PADdington 1867/8/9

BUILT TO STAND THE TEST OF TIME

Edinburgh Castle

CERAMIC EMBEDDED AND METAL CLAD INDUSTRIAL AND DOMESTIC ELECTRIC HEATING ELEMENTS



GEO. BRAY & CO. LTD.

LEICESTER PLACE. LEEDS 2.

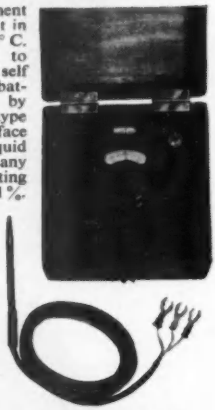
Tel. 20981 (8 lines) **'Grams: "Bray Leeds 2"**

SIFAM Precision INSTRUMENTS

A New Low Temperature Indicator

The THERMASTER

The most versatile instrument for temperature measurement in the range — 80° to + 200° C. Easy detection of changes to within 2°, instant response; self contained with small dry battery; readings unaffected by voltage change. Pencil type "Thermo-Detector" for surface contact, immersion, air or liquid temperatures; supplied with any length of leads without affecting accuracy. Accuracy ± 1%. Scale 8 in. long, can be scaled for any intermediate range, minimum 20° C.



From **£12-10-0**

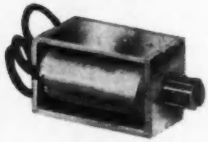
Complete with one element and 4-ft. leads.

For details of this and other SIFAM instruments, write for catalogue No. S.13.

SIFAM ELECTRICAL INSTRUMENT CO. LTD.

LEIGH COURT, TORQUAY *Phone: Torquay 4547-8*

PHIL-TROL SOLENOIDS



Now made in England

The first of this very popular range of solenoids or actuators is the small types 41 and 42. **Now in production.**

6v to 460v, A.C. and D.C. versions

WRITE FOR PAMPHLETS AND DETAILS—

PHILLIPS CONTROL (G.B.) LTD.

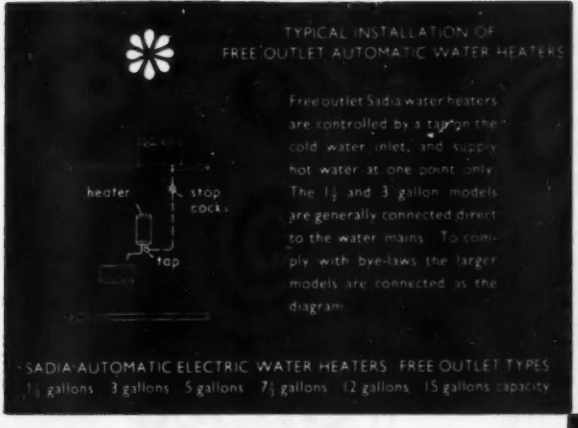
273 Farnborough Rd., Farnborough, HANTS.

Telephone: Farnborough 1120.

Current *Hot Water* Problems

If a housewife turns on her kitchen tap 100 times a day—how much* hot water *is left for washing?

There is always *hot water* to spare with a SADIA Electric Water Heater at the sink. This is the perfect supplementary hot water system for the busy kitchen, providing *hot water* always where the housewife needs it most. The SADIA is easily and conveniently installed; a single connection to a water supply and to an electric point—the saving in material and labour costs is very considerable. From the housewifes' point of view the SADIA is economical in use, beautifully clean—and so automatic in operation that it can be installed and then forgotten. We invite you to consult us on all matters concerning electric water heating by SADIA—the modern, economic, and efficient method of providing constant *hot water* from one tap or from many.


TYPICAL INSTALLATION OF FREE OUTLET AUTOMATIC WATER HEATERS
Free outlet Sadia water heaters are controlled by a tap on the cold water inlet, and supply hot water at one point only. The 1½ and 3 gallon models are generally connected direct to the water mains. To comply with bye-laws the larger models are connected as the diagram.
heater
stop cock
tap
SADIA AUTOMATIC ELECTRIC WATER HEATERS FREE OUTLET TYPES
1½ gallons 3 gallons 5 gallons 7½ gallons 12 gallons 15 gallons capacity

Efficient cork insulation. Welded copper water tank, tin coated. Pressure tested to 100 lbs. per sq. inch. Housed in steel sheet container. Stove enamel finished. Automatic thermostat control.

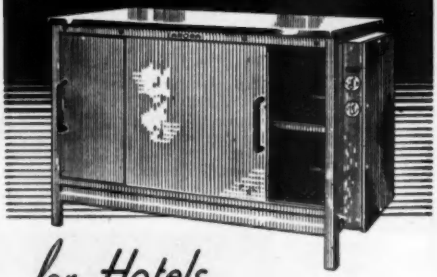
There's a natural answer

SADIA
Hot Water by Electricity

Write to: **AIDAS ELECTRIC LTD. SADIA WORKS, ROWDELL ROAD, NORTHOLT, GREENFORD, MIDDX. Phone: WAXLOW 1607**

Scottish Agents: W. Brown & Co. (Engineers) Ltd., 89 Douglas St., Glasgow, C.2
Manufactured in S. Africa by: Sadia Water Heaters (Pty) Ltd., 3-5 Newton St. Village Main, Johannesburg

'ARORA' electric
HOT CUPBOARDS



for Hotels, Restaurants & Canteens.

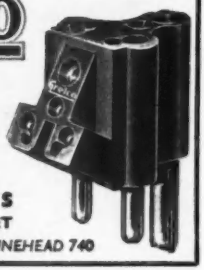
SEND FOR LEAFLET C 482

The ARORA Company ROSEBERY STREET, LOUGHBOROUGH
Specialists for over 30 years

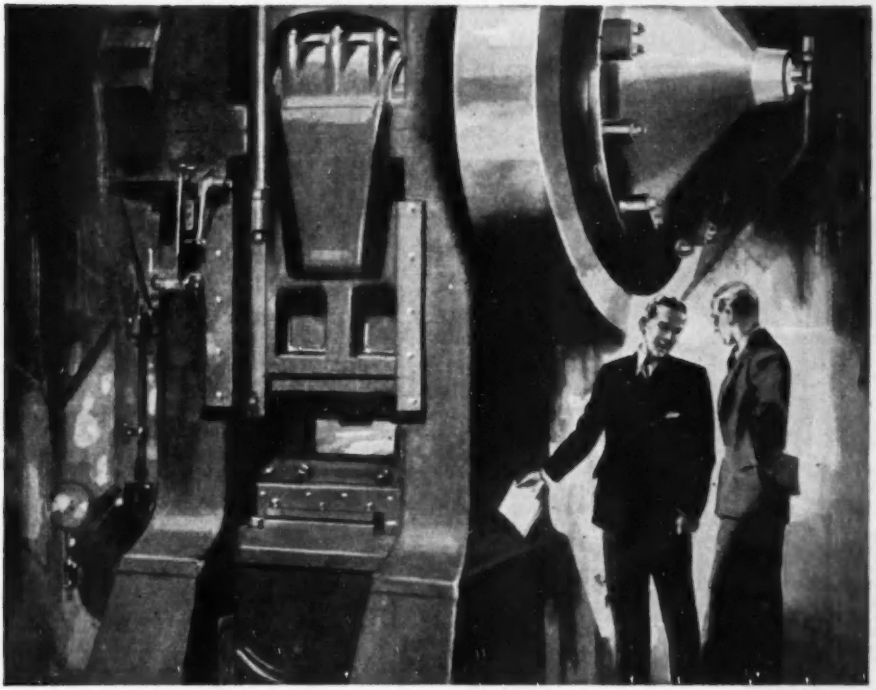
198

We Buy and Sell
all kinds of
ELECTRICAL PLANT & MACHINERY
We Invite
your enquiries and offers to:
WHITEFIELD MACHINERY & PLANT LTD.
Cobden Street, Pendleton, Salford 6

Grelco
LIMITED
MULTI-PLUG ADAPTORS



GRELCO WORKS
MINEHEAD, SOMERSET
Telephone and Telegrams : MINEHEAD 740



"Is the flywheel doing its job?"

C.P. MOTOR APPLICATION RESEARCH ENGINEERS have carried out very considerable investigations into the application of suitable motors for press drives and will be glad to give users and manufacturers of presses, without obligation, the benefit of their experience.

Crompton Parkinson LIMITED

CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

Phone: CHAncery 3333 *Grams: Crompark, Estrand, London*

ELECTRICAL EQUIPMENT

Absolute reliability

Service . . . . . .

Consistent quality .

Maximum satisfaction

Symbolised by

A.S.C.M. MEMBERS

ARE AS FOLLOWS:

ALMA & CRANMORE TUBE CO. LTD.
BARLOW, H. J. & CO. LTD.
ELECTRICAL CONDUITS LTD.
GENERAL ELECTRIC CO. LTD.
GRIFFITHS, ISAAC & SONS
HILDICK & HILDICK
McDOUGALL, JAMES LTD.
METALLIC SEAMLESS TUBE CO. LTD.
MONMORE CONDUITS LTD.
SIMPLEX ELECTRIC CO. LTD.
Comprising:
Credenda Conduits Co. Ltd.
Perfecta Tube Co. Ltd.
Simplex Conduits Ltd.
Stella Conduit Co. Ltd.
STEEL TUBE & CONDUIT CO. (Middlesbrough) LTD.
TALBOT-STEAD TUBE CO. LTD.
WALSALL CONDUITS LTD.

MADE IN ENGLAND
APPROVED & CERTIFIED
A.S.C.M
BRITISH STANDARD

Advertisement of the
ASSOCIATION OF STEEL CONDUIT MANUFACTURERS
96 HAGLEY ROAD · BIRMINGHAM

Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts, and published at Sardinia House, Sardinia Street, London W.C.2. August 13, 1953

LINE FUSES

PROVED BREAKING CAPACITY—EASY RE-PLACEMENT

Affording ease of assembly and connection, these fuses incorporate Aeroflex CM Type high breaking capacity rewireable cartridge fuse links. They are widely used in transformer low voltage protection.

Aeroflex
HOPE'S PATENTS

PARMITER HOPE & SUGDEN LTD
MANCHESTER 12 *London: 34, Victoria Street, S.W.1*
Glasgow: 162 Buchanan Street, C.1 Birmingham: 39/41 Carrs Lane, 4

dm PH 63

Most OF THE LARGE STEEL FIRMS ARE INSTALLING JOHN THOMPSON WATER TUBE BOILERS

2,500,000 lb. STEAM PER HOUR

is being generated at this moment from John Thompson Boilers in Steelworks in this country.

DORMAN LONG & CO.

Three boilers (first contract) and one boiler (repeat order) now steaming, with a second repeat order under erection. Each boiler 100,000 lb/hr normal evaporation, 125,000 lb/hr M.C.R.; working pressure 450 lb/sq in.

JOHN SUMMERS & SONS

Contract for three boilers completed and the boilers steaming. Each 85,000 lb/hr evaporation; working pressure 450 lb/sq in.

APPLEBY-FRODINGHAM

Three boilers in course of erection, each 85,000 lb/hr evaporation; working pressure 450 lb/sq in.

STEEL COMPANY OF WALES

We have recently installed three John Thompson —La Mont boilers, each 38,500 lb/hr evaporation, and three other John Thompson—La Mont boilers each 10,000 lb/hr evaporation; all at 175 lb/sq in. working pressure.

STEWARTS & LLOYDS

Two boilers in course of manufacture each 75,000 lb/hr evaporation, 450 lb/sq in. working pressure.

JOHN THOMPSON
Over a Century of Boiler Making

WATER TUBE BOILERS LTD.

ETTINGSHALL · WOLVERHAMPTON · STAFFS.

WT6